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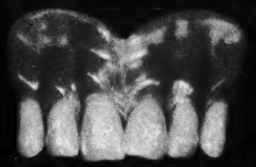

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Natural ARTICULATION *Movements*

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DIGEST

Modern concepts in articulation are approaching the realization that voluntary lateral movements at a given opening do not generate correct occlusal surfaces, curves, angles, paths, or pantographs. Nor do these lateral movements have any relation to natural function.

This paper contrasts the artificial lateral movements with the natural functional jaw motions. It shows the fallacy of employing the former and discusses the principles and the values of utilizing the latter.

Use of Bite-rim Articulation

Acceptance of the theory that artificially induced, voluntary lateral jaw motions are the basis of correct articulation automatically implies acceptance also that every occlusal surface, curve, angle, path, or pantograph generated by these artificial laterals must be correct for any given mouth at any given opening. For example, consider the simple grinding of what are known as primary paths or curves on bite-rims. The jaw movements used are identical with those used in every method employing artificial lateral movements.

Method of Grinding—(1) The operation begins with simple surfaced bite-rims set to an excessive opening in the patient's mouth. The rims contain abrasive so that they will grind each other away. (2) The patient is instructed to clench the rims and slide his jaw in all six horizontals: right radial, right medial, left radial, left medial, protrusive, and retrusive. (3) When the rims have ground themselves down to a predetermined vertical opening, they are removed.

Results Impressive but Fictitious—Examination shows that they have produced surface curvatures lying in all three planes. If the operator wants more or less opening he stops the grinding at the level desired and accepts the surfaces presented. Obviously he is convinced that the surface curvatures are correct for the vertical opening chosen. Yet if these surfaces are checked carefully for occlusal apposition, *they will be found to be out of contact at the posterior.*

Diverse Objectives of Grinding—(1) With or without a central bearing pin it may be desired to "mill" the teeth. This is supposed to correct clinical and processing errors occurring in artificial teeth and to result in perfect articulation. Oddly enough, no one would dream of "milling" malarticulated *natural* teeth.

(2) Teeth may be set up on one denture and be dragged back and forth across a soft material set on the rim of the opposing denture in order to leave imprints of the cusps and their excursions. This is presumed to establish cuspal travel paths or, as in the case of "check bites," terminals of movement purporting to show how apposing teeth should be articulated.

(3) A battery of styli may be attached to the jaw to scribe pantographic records of jaw movements outside the head. This operation can be a highly complicated procedure.

Results Are Similar—No matter how much or how little effort or apparatus may be entailed, the action and the final result remain virtually the same. Technical changes may create slight differences. Empirical or sciolistic additions or deletions may help or hurt to a limited extent. Except for such insignificant variations, the results will be alike because the motions used are alike.

Example—Suppose a set of artificial teeth is "milled" in the patient's mouth. "Milling" need continue only long enough to reveal that the back teeth have ground themselves out of contact. A typical result is shown in Figure 1. It should be noted that the non-contacting teeth are medial rather than distal to the condylar controls. The familiar physical law that faster grinding will occur at the perimeter than near the center of a circle is being upset.

Teeth Abraded—Examination of the occlusals will show also that the teeth have been abraded into gross club ends with little semblance to normal cuspation. The result is similar to that produced when grinding bite-rims. It could hardly be otherwise as the basic movements are the same. If the operation started with

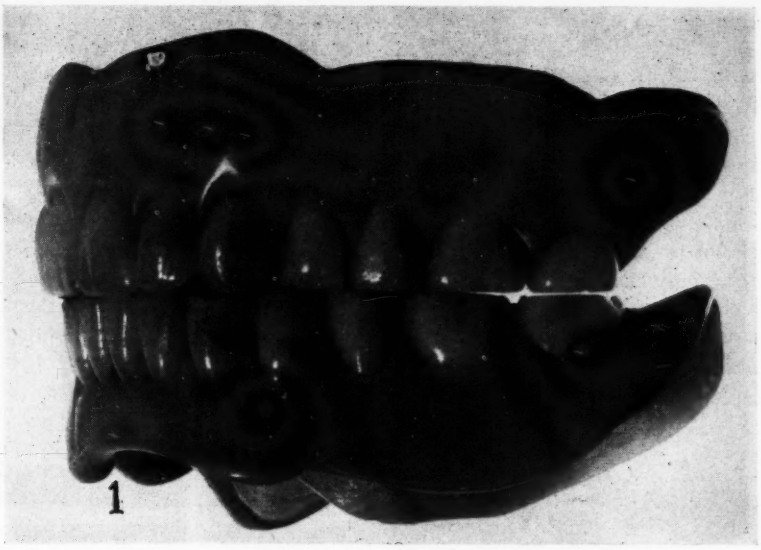
teeth already exquisitely articulated "milling" would, with equal impartiality, reduce them to coarse butts in a short time. Obviously laterals do not cease "milling" when correct articulation is present or attained. If artificial and voluntary laterals produce perfect curves, paths, and articulated cuspal surfaces, how can these unfortunate results be possible?

Articulation Method Involving Envelope of Motion

One of the most exacting articulation methods in existence uses the patient's radials (outward lateral and protrusive movements) only. These are scribed in three dimensional pantographic records outside the patient's head. The pantographic tracings are etched permanently on glass before being transferred to the articulator where they dictate how the instrument controls are set. The procedure is made impressive by the statement that the articulator is set to an "envelope of motion." The following discussion of the factors involved in this envelope of motion may be helpful.

Features of Technique—Pantographs are perfect media for duplicating complicated motions just as they come from their source. *If jaw radials are necessary and sufficient for the purpose*, there need be no question but that these paths could be reproduced in all three dimensions by the sensitive articulator used in this method. The technique also uses a single line hinge-axis with its ends based upon symmetrical point centers as the origin and terminal of all movements. *If such a hinge-axis be correct*, all movements in the sagittal or median plane would be coordinated with the radials. Hence, there would be no need of tracing jaw movements lying wholly in any one plane.

Principle is Sound—When coordinated movements in all three planes have been captured, simple movements in any selected plane will integrate automatically. Therefore, the envelope of motion should be a reality. Satisfied of this, proponents of the technique confidently inject any convenient vertical incisal guidance in order to obtain anatomic cusp formations instead of the usual stubs. The principle underlying this envelope of motion is correct.



1. ***Effect of "milling" teeth in patient's mouth. Posteriors are not in contact, a characteristic result of*** **all** ***lateral motion techniques. See text.***

Method of Application Unsound—Unfortunately, the application of the principle inherent in this envelope of motion is doubtful. There is no question that *an* envelope of motion is produced but the motions recorded are distal to and therefore cannot be those determining the articulation of teeth.

Teeth do not Grind Themselves into Articulation—As stated previously, artificially induced and voluntary lateral jaw movements do not produce occlusal surfaces, curves, angles, or paths that are correct for natural occlusion. The Gnathological Society of California has emphasized for years that teeth do not grind themselves *into* articulation, they grind themselves *out* of articulation. If lateral movements produce fictitious occlusal surfaces when used *directly*, is it to be expected that they will record pantographs from which occlusal surfaces can be derived *indirectly*? The answer would appear to be negative.

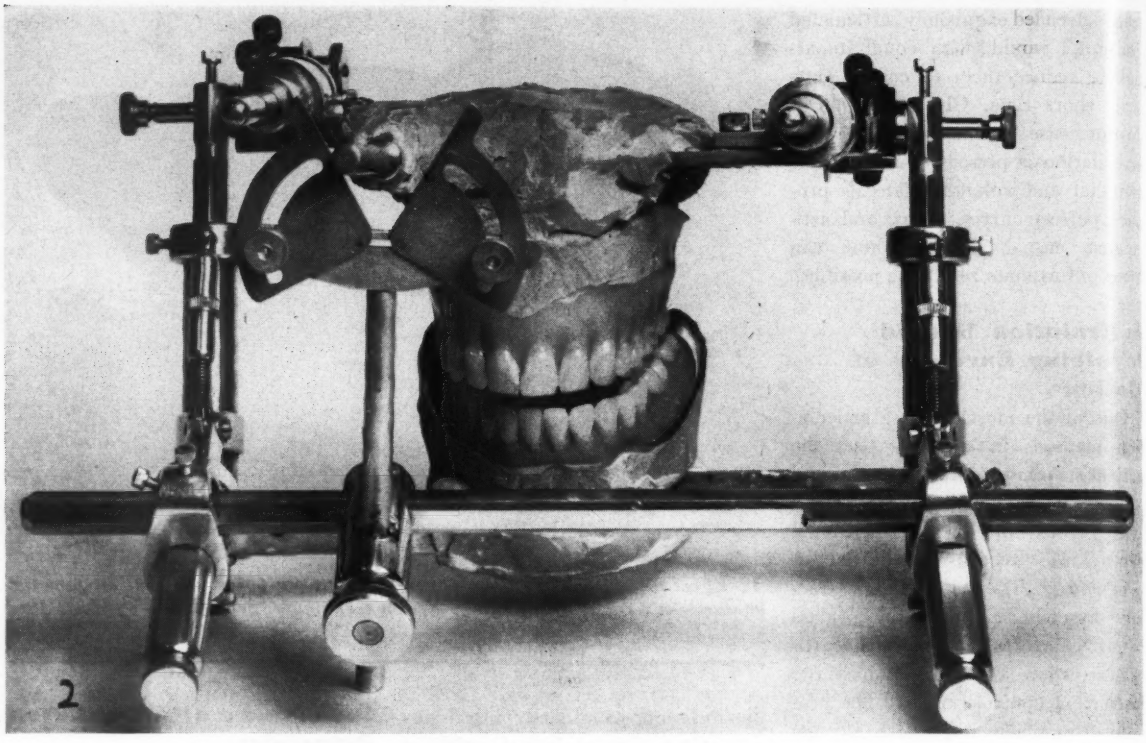
Importance of Articulation Principles

The Gnathological Society of California should be accorded honors for the articulation principles it sponsors which offer a means of preventing traumatogenic periodontal disease where the x-ray, as indispensable as it is, can only report the presence of destruction already begun. After a quarter of a century, however, even the enthusiastic efforts of the society's outstanding member, Beverly B. McCollum, has inspired only a few. It would seem that too much emphasis has been given to procedures while the all-important principles have been neglected.

Mucostatics as a Principle—In the impression field knowledge of the importance of mucostatics as a principle enlarged despite opposition because it is not to be defined as a technique. It is a principle, not a method. Using the principle as a guide encouraged dentists to devise their own methods, simplifying and improving them.

A Sound Concept—Today the mucostatic principle[1] is generally conceded to be a sound concept and

[1]Jones, Carroll W.; Peisch, Henry C.; and Page, Harry L.: "Lasting stability demands an impression and denture base that are accurate negatives of the ridge tissues in their normal, passive form." Paper read before the Southern California State Dental Society, 1940.



2. ***Jaw movement guide cams on the instrument set to the patient's transverse chewing angle. The mandible is at start of the chewing stroke on the left side. See text. (Illustration by courtesy of Transograph, Inc., Minneapolis, Minn.)***

is attended by numerous successful methods. Rather than to concentrate upon procedures, a study of the principles involved in natural articulation should be valuable. Having acquired an understanding of these principles, dentists should be capable of evolving appropriate means of application. A composite of their theories would prove to be a definite step forward.

Primary Concept, the Hinge Axis—In its opening and closing movements the jaw must revolve upon *something* just as does any object that turns in a circle. A wheel rotates around its axle; a door, like a wheel with only one spoke, rotates around its hinges. Axles and hinges, however, are not the actual hinge-axes. They are only the necessary physical controls that keep the mechanism travelling along a path constant to the hinge-axes and prevent it from straying in unwanted and harmful directions.

A Physical Control—In the same way, the fulcral point on the mandibular fossa against which the condyle sets itself and pivots in final closure is a physical control. With the help of the muscles and ligaments it causes the jaw to shut consistently on the same arc in final closure. While doing so the condyles are in their "hinge positions," a situation defined as "that position of a condyle in its fossa that permits the location of a hinge-axis." This condyle position is not, however, the hinge-axis itself. Neither is the pivotal contact point between the condyle and the fossa.

Definition of Hinge Axis—Through every axle, bearing, or hinge pin there runs an imaginary line. The earth, spinning in space, is pierced through its center from north to south by a similar theoretical line. All objects engaged in circular motion *must* revolve upon such an imaginary or theoretical line or axis. Although the condyle revolves through only a fraction of a circle, it engages in rotary motion nevertheless. Consequently, it does so while revolving upon this same theoretical axis. A hinge-axis has been defined as "a theoretic axal center of rotation that pierces a condyle transversely."

Importance of a Kinematic Constant—In all bodies engaged in circular motion any given point on this theoretical hinge-axis is constant to any point, both on the mobile and immobile parts of the mechanism. A doorknob, for instance, may swing back and forth with a door indefinitely but its radial distance from any point on the center or hinge-axis of the hinge pin will never vary. Likewise, that same hinge-axis point will always be exactly the same distance from, for example, a certain nail in the unmoving door frame. The importance to articulation of such a kinematic constant will be obvious.

Constant Radius Maintained—With either of the condyles in hinge position and acting as fulcra in final closure, the hinge-axis of the working condyle maintains a constant radius from any chosen point on the moving mandible. It also maintains

a constant distance to any chosen point on the immobile cranium. Once these same radii can be established in the articulator, the technician cannot make a mistake. Teeth set up to occlude sagittaly without interference in the instrument must repeat this smooth sagittal plane interdentation in the head. The articulator would now have complete control of all final jaw closure movements in the sagittal plane. At this point, however, a difficulty occurs.

Point Centers Limit Movements—The action of every standard articulator turns upon a single line hinge-axis supported between symmetrical *point* centers of rotation. This limits all opening and closing movements to a plane median to that single hinge. Occlusals prepared in or mounted to such a control can approach each other and interdentate on that plane only. If horizontal or transverse plane collateral movements are to be incorporated, it must be done (A) by guesswork, or (B) by forcing the articulator to follow arbitrary pantographic records of artificial lateral movements.

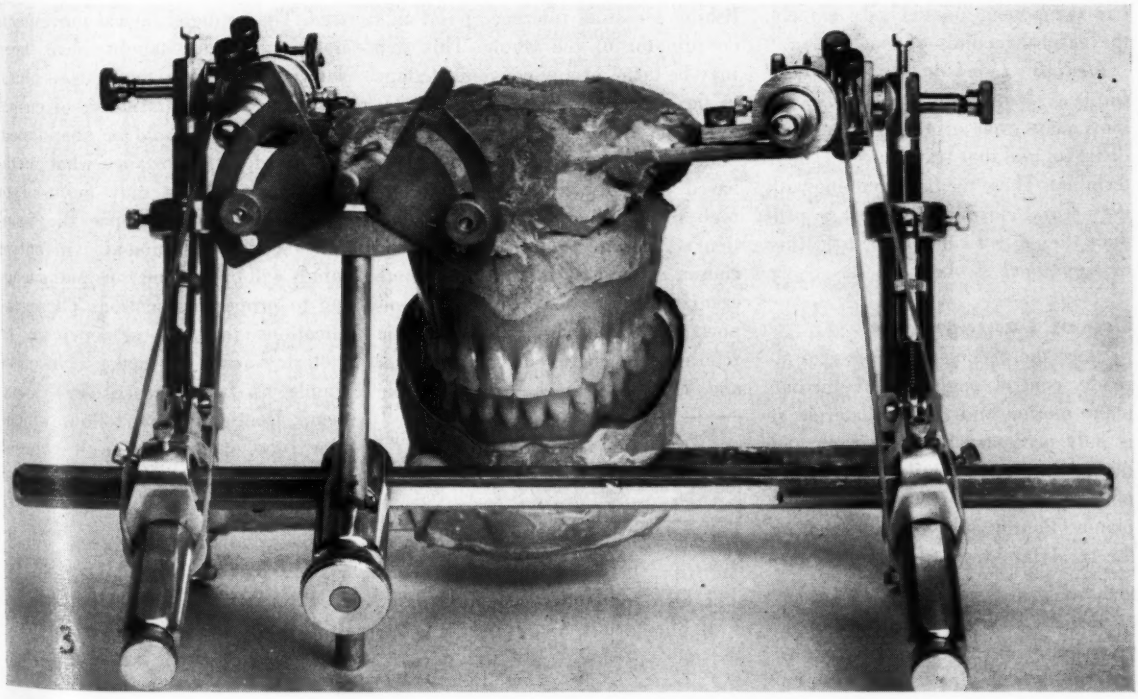
Different Application Necessary—The principles are still sound. It is only the procedures and the instrumentation that are faulty. For this reason, another method of applying the principles is sought. This method is not only germane to the problem, but also proves to be quite simple.

Bennett Movement—Jaw movements in the transverse and horizontal planes that are collateral to those in the median and sagittal planes are relatively small. This is most fortunate. In vertical opening and closure they result in what is known as the Bennett movement. The Bennett movement originates in the asymmetry of the condyles. One will be higher, lower, anterior or posterior to the other. One will also be larger or smaller, or of a different shape. Consequently, the hinge-axis of one condyle will be completely out of line with its mate.

All Movements Must be Captured—With such divergent centers, radii, and hinge mechanisms, the jaw cannot open and close wholly in a median or a sagittal plane. There will be small but important combinations of collateral movements both in the transverse and horizontal planes. These movements *must* be captured. This can be done by the simple expedient of changing the articulator joints from artificial *point* centers with a single line hinge-axis to naturally *asymmetrical axal centers with an individual and independent axis for each condyle.* This results in what is known as a "broken axis."

Axes Lie in Different Median Planes—Objection will be made that this is a mechanical impossibility, that a single object such as the jaw or an articulator frame cannot revolve upon two asymmetrical axes. This would be true if the axes lay in the same median plane. It is not true when axes are independent of each other and lie in widely separated median planes as do the condylar hinge-axes. In the articulator the extent of the arcing will depend solely upon the flexibiity of the supporting mechanism.

Occurrence of Collateral Movements—As flexing occurs, collateral



3. ***Chewing stroke finished. Cusps and inclines do not "balance" but just clear each other while moving into simultaneous, final occlusion. See text. (Illustration by courtesy of Transograph Inc., Minneapolis, Minn.)***

movements along the transverse and horizontal planes will ensue, a sort of mechanical protest against being forced to rotate upon untrue bearings. Since *only the extent of arcing* depends upon the flexing capacity of the mechanism, these collateral movements will always be the same at any given degree of revolution. Therefore, two instruments with different flexibilities will produce the same amount of collateral movement at the same point of the opening or closure arcs.

The Jaw is a Mechanism—Essentially, the jaw is an instrument such as has been described. As it opens and closes, its movements will conform to the same pattern and collaterals through the same degree of opening. There is one difference. Not being controlled by close fitting shaft and sleeve joints but being loosely held by the capsular ligaments, the condyles will slide bodily along the resultant of the combined collateral movements. Despite this difference in the *type* of movement, the effect will be equivalent.

One Component Still Unattached—The major movements already captured in the sagittal or median planes have now been complemented by their collaterals in the transverse and horizontal planes. This leaves only one component unattached; namely, the natural medials of mastication.

Medials Combine with Natural Closing Movement — Medials are movements that originate at a point distal to, and that travel toward, their terminal. These medials combine with the natural closing movement to produce the patient's natural masticating or functional stroke.

Use of Pantographs

Since the articulator hinge-axes already control sagittal and median plane motion and their collaterals, it is only necessary to pantograph and incorporate the patient's chewing path in the transverse and horizontal planes. Pantographs obviate locating the condylar hinges that control medial motion. This is fortunate because there is no way of locating the actual hinges with any means at present available.

The Jaw in Function—In function, the mouth is first opened generously. Next, the jaw is shifted to one side or the other in search of food to be chewed. Once the food is located and the morsel grasped, the jaw is lifted and swung in combined vertical (upward), medial (inward), and protrusive (forward) motion. This movement is pantographed readily in the transverse and horizontal planes.

Experiments Verified—As verification of the author's own experiments Boswell,[2] Payne,[3] and Kurth[4] are cited. Within the range of interdentation the angle of the chewing stroke in the transverse plane holds within fairly narrow limits. The flattest angle is around 55 degrees while the steepest is under 70 degrees. This angle is reproduced readily in a suitable jaw duplicator by an adjustable jaw movement guide with the cams set to the patient's pantographic record (Figs. 2 and 3).*

Establishment of Cranial Reference Point

The step without which no articulator has any value consists of establishing a cranial reference point as a coordinator of the whole. This step may be taken at any convenient stage in the procedure.

In the head, a cranial reference plane is selected. This may be a plane based upon the hinge-axes and any real or imaginary point on the patient's cranium. *Which* plane may be chosen is immaterial but that *some* cranial plane be used is of vital importance. Otherwise, all kinematic relationships between the cranium and the lower jaw, except simple movements that lie wholly in the median plane, will be lost. Whatever the plane, it has been designated as the "cranial relation."

Definition—The cranial relation is defined as "the relationship between the hinge-axes and any convenient cranial reference point."

Plane Angles at Intersection Coordinated—Now let the median or sagittal plane angle at which each condyle in translational motion intersects this cranial plane be coordinated and the whole be transferred to a suitable articulator.

Natural Synergy Complete—To the natural, functional, and basic opening and closing movements, all possible functional medials and collaterals have been joined in the instrument. The *natural* synergy, the *natural* envelope of motion is complete. A kinematic reproduction of the patient's *natural* jaw relationships is now available on the laboratory bench.

Conclusion

If a malarticulated natural dentition is to be diagnosed and corrected, or an edentulous mouth is to be restored with an efficient chewing mechanism, *natural, functional jaw motions must be captured and utilized.* The artificial lateral movements now universally taught have been shown to produce fictitious occlusal curves and to be mutilators of cuspal surfaces. They should be abandoned.

It is of no importance what methods and machines may be used to apply this concept. Once the principles are assimilated, inventive minds will open numerous paths leading to proper application. These applications may be as intricate as esoteric science *can* make them or as simple as true science *does* make them. Dentistry may follow whichever type of application it chooses but should prepare to follow one or the other.

104 *Garfield Avenue.*

*Courtesy of Transograph Incorporated, Minneapolis, Minnesota.

[2]Boswell, J. V.: Practical Occlusion in Relation to Complete Dentures, J. Pros. Dent. **1**:307.

[3]Payne, S. Howard: A Study of Posterior Occlusion in Duplicate Dentures, J. Pros. Dent. **1**:322.

[4]Kurth, L. E.: Problems Related to Occlusion with Complete Upper and Partial Lower Dentures, J.A.D.A. **43**:691.

MOUTH REHABILITATION

in Practice

MURRAY N. RUBINSTEIN, D.D.S., New York

DIGEST

When properly applied the techniques of mouth rehabilitation provide so much improvement and satisfaction for the patient that the subject of occlusal restoration is one of enduring interest to the dentist. Success in this phase of dentistry is, of course, dependent on proper diagnosis, intelligent planning of treatment, and skillful execution of the procedure decided upon. This article describes the step-by-step technique employed in the rehabilitation of a case in which previous treatment had been inadequate.

Prevention the First Objective of Treatment

Errors in past treatment or lack of treatment are responsible for many cases requiring extensive correction. The first objective should be to prevent the conditions that cause the development of flagrant malocclusion.

Perpetuation of Faulty Occlusion Avoided—Proper treatment planning and execution must begin when the patient first presents for the treatment of caries. Rebuilding lost tooth areas with correct cuspal and contact form, and if required, tooth replacement and reduction, and correction of extrusions should be completed before the restoration is started. In this way creation and perpetuation of faulty occlusion and the possibility of future difficulties will be avoided.

Complete Rehabilitation May be Required—It is obvious that if the patient has not received proper care previously, he will present difficulties which require revision of previous treatment and may require complete rehabilitation.

Case Report

The following case report is an illustration of this problem. Clinical examination of a patient in her late forties disclosed the following conditions:

1. Upper and lower precision attachment appliances improperly designed and constructed.

2. The upper anteriors were chipped and broken off for more than one third of their normal length.

3. The tooth length in both jaws showed irregularities in height, permitting free food impaction and occlusal trauma with resultant injury to the periodontal attachment.

4. Mastication was restricted, causing pain in the temporal area after eating.

Former Treatment Insufficient—Although this patient had received treatment, no advantage ensued from treatment because the malocclusion was perpetuated. With a different approach this case could have been successfully concluded. Additional consideration should be given to treatment planning to avoid the waste involved in failure.

Primary Considerations Neglected—In a previous article the author[1] stated, "Any consideration of restoration in mouth rehabilitation has as its primary factor the re-establishment of occlusal harmony integrated with principles consistent with function. The ultimate aim should be to rebuild the dentition to an equilibrated occlusion where maximum tooth contact in any of the mandibular positions may be obtained in function. The masticatory load being reduced on individual teeth, (1) improved physiologic tone, and (2) general health dentally, may be anticipated."

Obtaining Maximum Distribution of Stress

The following summary of essential factors should be considered in procedure to obtain maximum distribution of stress:

(a) Retention of the rest position.

(b) Harmony of inclined planes which will reduce eccentric occlusal stresses. The planes of the teeth should be restored at a level and degree consonant with the age of the patient.

(c) Maximum distribution of stress in centric relation.

(d) Reduction of inclines of guiding tooth surfaces so that occlusal stresses may be more favorably applied to the supporting tissues.

(e) Retention of tooth anatomy to secure sharper cutting cusps and satisfactory sluiceways.

(f) Observance of the requirement of biomechanics that the clinical crown should be definitely shorter than the length of root surrounded by bone.

(g) The buccolingual diameter of all rebuilt teeth should be kept to a minimum. This will tend to reduce the stress of mastication by confining the load in a line with the long axes of the teeth where it can be most satisfactorily borne. It is desirable to secure lateral balance in eccentric positions of the mandible for the maximum distribution of stress.

---

[1]Rubinstein, Murray N.: Occlusal Rehabilitation in Practice, DENTAL DIGEST **58**:465-470 (April) 1952.

Diagnosis and Treatment Planning—The factors listed are valuable in this phase of treatment; haste in judgment should be avoided. It is important to avoid an increase in vertical dimension; unless there is evidence of temporomandibular disorder, it is necessary to restore the damaged teeth to the previous level, the main objective being a reconstructed level consistent with the age of the patient.

Proper Incisal Length Recreated—In the case described, the patient's anterior teeth were badly chipped. These teeth were not abraded but chipped in function due to a collapse of the molars. Rotation about the bicuspids because of loss of molar stops resulted in the breaking of the incisal edges of the anteriors.

Careful study of the case determined that it would be necessary to restore the molar relation in order to re-create proper incisal length. In this case so-called general bite opening would result in failure as it would not be a permanent correction.

1. ***A complete set of x-rays, including bitewings, were taken.***

Steps in Reconstruction

The following steps were taken in management of reconstruction in the case cited:

1. A complete series of x-rays, including bitewings, were taken (Fig. 1). Note favorable trabeculation despite the extreme extrusion of the molars, and trauma anteriorly. Some loss of alveolar bone about the upper anteriors may be noted.

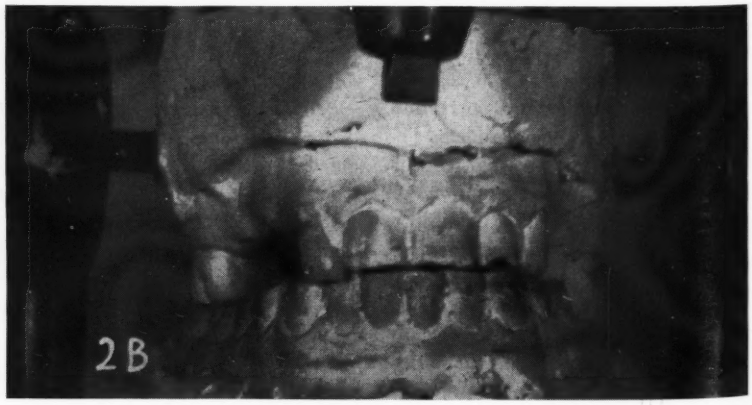
2. Photographs were taken (Fig. 2A) and study models were made from alginate impressions. Duplicate models were poured from the original impressions. The original models are kept for permanent records. The second set of models, used in planning the corrections required, were mounted, using the face-bow, on an adjustable articulator (Fig. 2B).

Diagnosis

Note the badly chipped centrals, left lateral, and the molar relation (Figs. 3A and 3B). It is particularly interesting to observe that the right lateral was but little affected; it is presumed that the molar relation on the right side, having a natural tooth on upper and lower, the resultant stop somewhat prevented pivoting rotation and chipping of the lateral on this side. The patient complained of almost constant pain in the temporal region, probably due to the rotation.

Study of Radiographs and Models—The following conditions were disclosed from study of the radiographs and study models:

2A. ***Photographs were taken.***



2B. ***Study casts articulated.***

3A. *Closed relation. Dentures are not in place.*

3B. *Tip-to-tip relation.*

4A. *Models with original dentures in position.*

4B. *Centric relation with dentures in position.*

1. The absence of the lower right first molar with resultant mesial dip and drift of the second and third molars. This resulted in the extrusion of the upper right first molar for approximately 2 to 3 millimeters.

2. On the left side, loss of the lower molars and subsequent settling of the denture permitted the upper molar to extrude to about 4 or 5 millimeters.

3. Both centrals, left lateral, and cuspid were chipped with a loss of approximately 3 millimeters.

4. On the upper left, the first bicuspid, and the second and third molars were missing. It was noted that the upper left second bicuspid was restored with a three-quarter inlay which was rebuilt to the existing occlusion.

5. The patient wore upper and lower precision appliances fabricated to the existing bite.

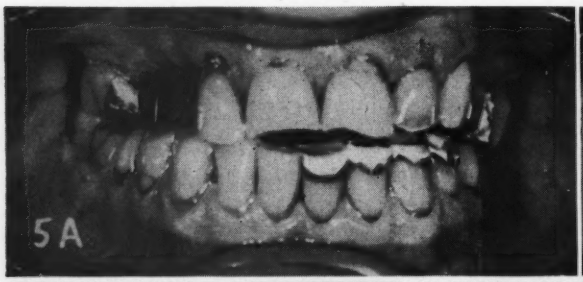
6. Apparently due to the traumatic occlusion, there was gingival resorption and some inflammation (Figs. 4A and 4B).

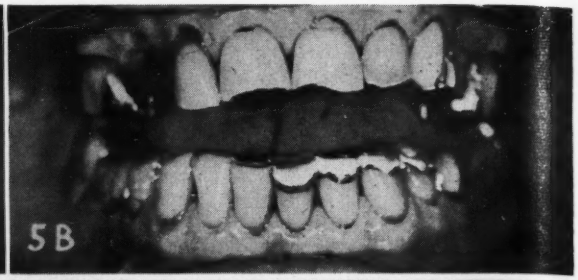
Decision for Treatment—It was decided (1) to restore the lost tooth structure with modification, allowing for the age of the patient, and (2) to secure a balanced occlusion on an ideal plane.

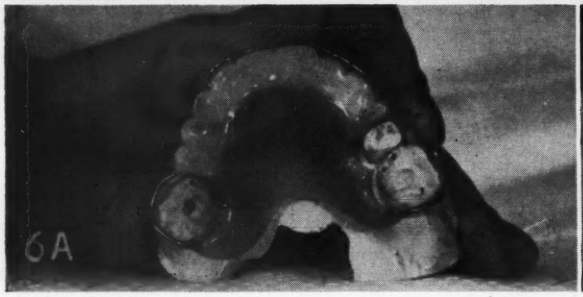
Treatment Technique

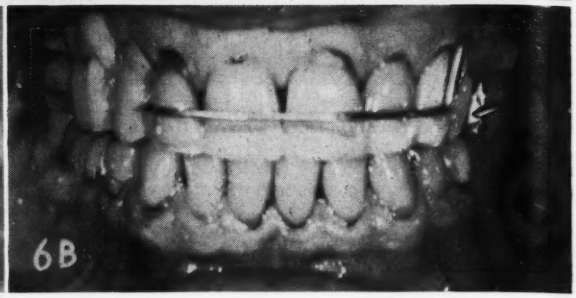
The patient received complete periodontal care and was given instructions for home care. To facilitate the establishment of an ideal occlusal plane it was planned to equalize the incisal length of the lower anteriors, particularly the left lateral, cuspid, and bicuspids. To achieve a precise result, a silver jig (Fig. 5A) was cast to fit the study model and was cut through on the affected teeth until the ideal length was attained. This jig was transferred to the mouth and the teeth dressed down to the jig accurately (Fig. 5B).

Bite Plate Employed—To establish the comfort of the intended plan for rehabilitation, it was decided to employ a Hawley bite plate (Fig. 6A). Using the right lateral as a guide, the







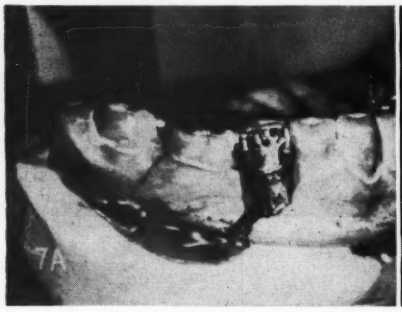


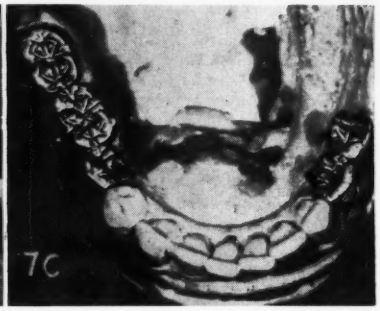
5A. *The jig in position.*

5B. *The tooth adjusted.*

6A. *Hawley bite plate, occlusal view.*

6B. *Bite plate in the mouth.*



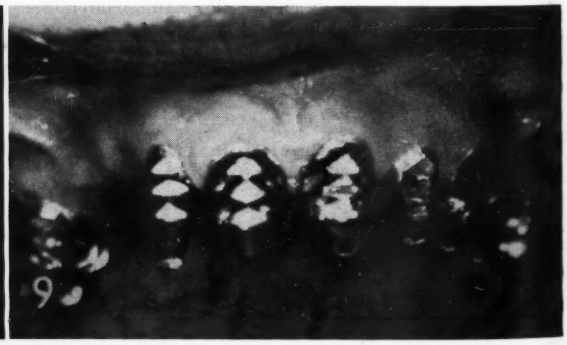


bite plate was built, restoring the lost tooth structure to what seemed normal length. The missing upper teeth were added to the bite plate and the occlusal plane was placed in contact with the lowers. It should be noted from Figure 6B that the bite was not appreciably opened as the right lateral is virtually the original length. The patient was immediately comfortable; after one week execution of the case was started. Fast curing

7A. *Right side. Two molar MOD's. Bicuspid veneer crown.*

7B. *Left side. Two bicuspid veneer crowns.*

7C. *Occlusal view.*



8. *Temporary acrylic crowns on left cuspid, lateral, central, and right central. Bite plate trimmed to accommodate.*

9. *Transfers in position.*

acrylic was added to the bite plate at the anterior teeth to restore lost tooth structure and to improve esthetics.

Procedure—1. The lower was to be restored by rebuilding to the new occlusal plane established with the bite plate as described.

2. The lower right molars were prepared to receive MOD inlays.

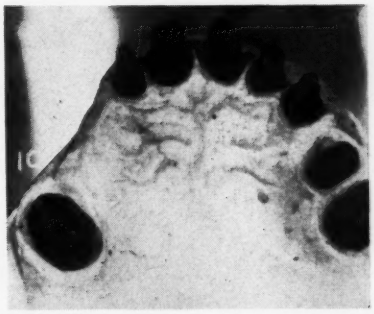
3. The lower right second bicuspid and both left bicuspids were prepared for acrylic veneer cast gold crowns.

4. Silver transfer copings were made for the crown preparations, placed on the teeth, and an alginate impression for the entire lower was taken.

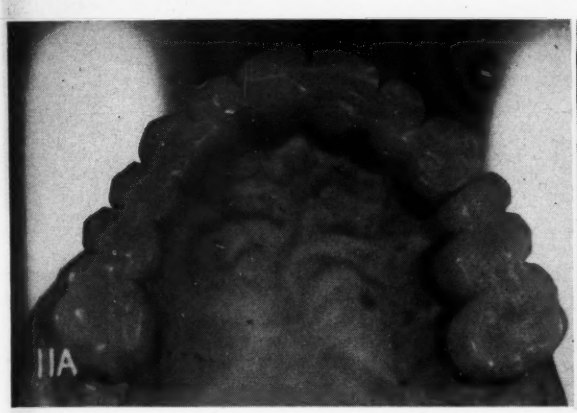
5. A counter impression of the upper with the bite plate in position was taken and also a bite registration in wax.

6. The lower was poured in diolite stone die material.

(The alginate impression, taken under strict observance of the manufacturer's instructions, is extremely useful for the multiple construction of inlays and crowns in the laboratory.)

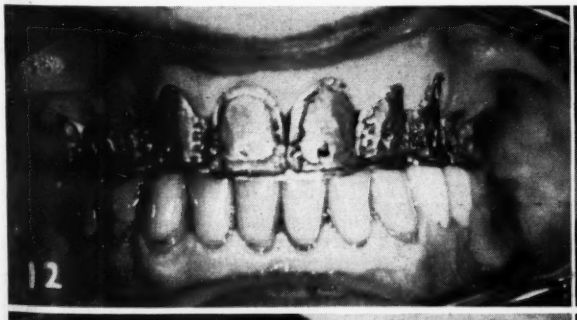


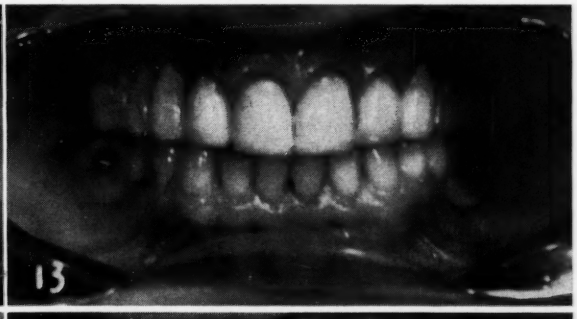
10. ***Upper model.***

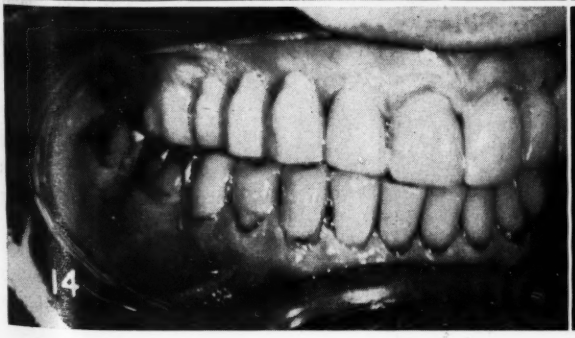


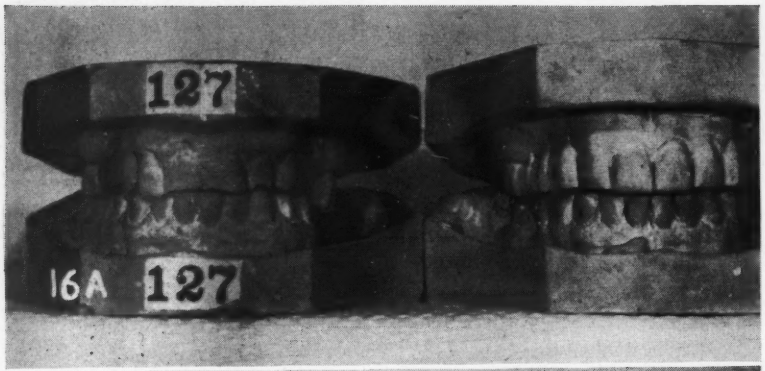
11A. ***Acrylic splint, occlusal view.***
11B. ***Acrylic splint in position.***
12. ***Gold construction in position.***
13. ***Finished case. Centric relation.***
14. ***Finished case. Right lateral.***
15. ***Case in left lateral.***

7. It should be noted that while steep cusps were studiously avoided, this case was constructed employing a curve of about 10 degrees. Figures 7A, 7B, and 7C show the fabricated









16A, 16B, *and* **16C** *show comparative views of original case and final reconstruction.*

gold construction, right, left, and occlusal views, respectively.

8. The gold construction was tried in the mouth and checked. A small plaster impression was taken on the left side for the purpose of splinting the two bicuspid crowns for reciprocal support. The two molar inlays were then cemented.

9. The three crowns were placed in position and a plaster impression was taken for the construction of the precision denture.

10. The missing molars were restored using a unilateral precision attachment with a mesial attachment on the right and distal attachment on the left.

11. After a trial of this case in the mouth for a few days, the lower crowns were cemented, thus completing the lower.

Restorative Procedure for Upper

1. It was decided to complete the upper in fixed bridge construction with all the crowns splinted together

17A *and* **17B.** *Views of the patient are shown before and after rehabilitation.*

for reciprocal advantage. For patient comfort the anteriors were prepared first and immediate temporary acrylic crowns were made with fast curing acrylic.

2. So that the bite plate would continue to function, the teeth prepared were cut out from the retainer, enabling it to return to place correctly (Fig. 8).

3. All the upper preparations, using full shoulders, were completed and silver transfer copings were made. These were all placed on the prepared stumps (Fig. 9). As no inlays were prepared, a plaster impression was taken, and also a new lower counter impression (Fig. 10).

4. Using the original temporary acrylic crowns as a stop, a bite registration was taken, transferred to the articulation, and checked.

5. For the patient's comfort and also as a preview of the proposed reconstruction, it was decided to make a test case in acrylic. To secure accuracy, this case was completed in regular acrylic from a wax pattern (Fig. 11A). The splint is shown in position in Figure 11B.

6. After a satisfactory trial period, the permanent gold veneers were constructed. After checking the crowns in the mouth a full plaster impression was taken and the crowns were splinted two at a time and then tried in.

7. A new impression was taken and the pontics made for the missing teeth. All remaining open contacts were soldered together and tried in the mouth again (Fig. 12). The shade was then matched and the case completed and cemented.

Conclusion

From the moment the Hawley appliance was inserted this patient secured immediate relief from her difficulty. No discomfort was experienced throughout the procedures because of the use of fast curing acrylic in the temporary crowns. The secret of maximum success in this phase of dentistry is careful planning and skillful execution.

200 *Central Park South.*

Water Fluoridation: The Respective Responsibility of the Health Professions and the Community

PUBLIC health workers at the local, state, and federal levels now recognize tooth decay as a real public health problem. The dental profession has long recognized the inadequacy of reparative procedure as a complete treatment for caries. Tooth decay is occurring at an increasing rate in the mouths of school children. Approximately 30 per cent of the American public seek adequate dental service. The remainder request treatment occasionally and then chiefly on an emergency basis. These conditions exist because of ignorance, indifference, fear, and last and least of all, economic reasons. However, they spurred the dental profession in the search for some method whereby the rate of tooth decay can be reduced.

To H. Trendley Dean and coworkers of the U. S. Public Health Service belongs everlasting credit for the clear-cut demonstration that children raised in areas where the communal water contained small amounts of fluorides experienced less tooth decay than children of comparable age in non-fluoride areas. This discovery suggested a possible means of reducing the prevalence of caries throughout an entire community.

Several studies have been instituted, notably in Newburgh (New York), Grand Rapids (Michigan), and Evanston (Illinois) to test the hypothesis that the addition of 1 part per million of fluorine to the public water supply will lower the caries experience of children raised in the community. While none of these studies has as yet been completed, results to date show a significant lowering of the caries rate in the children under observation. There is no evidence to suggest that water fluoridation will prevent all dental decay. To accomplish this end we must continue to practice proper dietary control and hygienic methods.

Some protests against the program of water fluoridation have been made on the basis that fluorides are poisonous and therefore likely to result in damage to body tissues. These objections are made without consideration of the fact that several millions of people have consumed water containing 0.5 to more than 5.1 parts per million of fluorine for many years without manifesting tissue damage attributable to this chemical. Again the feeding of fluoride salts to animals at a much higher concentration than is recommended for water treatment has failed to indicate that fluorides at such levels are harmful.

It is the responsibility of the health professions to advise the public regarding recent advances for the control of all forms of disease as rapidly as the facts unfold. When methods are developed which are applicable to an entire community the civic bodies should be so advised. It is the responsibility of the people to determine if and when they desire to adopt such programs. The Institute of Medicine of Chicago has endorsed the program of water fluoridation in the belief that it is safe and that it is the most effective method now available for the control of caries at the community level.

From Editorial, *Proceedings of the Institute of Medicine of Chicago* **19**:242 (Feb. 15) 1953.

Vitamin B_{12} in TIC DOULOUREUX

LYON P. STREAN, Ph. D., D.D.S., Rahway, N. J.

DIGEST

Tic douloureux is a disease characterized by severe paroxysms of pain involving one or more branches of the trigeminal nerve. Many therapeutic agents have been used in an attempt to give relief, but in most instances the results have not been satisfactory. Recently vitamin B_{12} has been subjected to clinical trial in more than 200 cases of tic douloureux with definitely favorable results.

This article discusses the distribution and function of the fifth cranial nerve in relation to the clinical features of tic douloureux and presents several case histories of special interest to dentists in which vitamin B_{12} was an effective means of treating this painful disease.

Trigeminal Nerve

The great sensory nerve of the head and face, the trigeminal nerve is the motor nerve of the muscles of mastication. The fibers of the sensory root which arise from the cells of the semilunar ganglion divide into three peripheral branches: (1) the ophthalmic nerve, (2) the maxillary nerve, and (3) the mandibular nerve (Fig. 1).

Unusual Characteristics in Tic Douloureux

Several unique features are presented in tic douloureux:

1. The preponderance of attacks occur in females and the incidence is higher in patients over 40 years of age.

2. Only one side of the face, usually the right, is affected.

3. While all three divisions of the fifth nerve may be involved, the pain is usually limited to the second and third divisions and, at times, only to the secondary branches of these two divisions.

4. Facial spasms may occur through transference of stimuli to the seventh nerve.

Etiology

The etiology of tic douloureux is unknown but several theories, including the following, have been advanced:

1. It has been suggested that the disease is caused by sclerosis of cells and arteriosclerosis of the blood vessels of the semilunar ganglion, or to vasospasm of the blood vessels supplying the center.[1] However, Grant[2] studied the ganglia and nerve trunks from two patients with tic douloureux who died of apoplexy and found no difference between the affected and unaffected sides.

2. Karl, et al.,[3] suggest that tic douloureux is the result of a peripheral ischemia involving the sensory root of the semilunar ganglion, and that efferent impulses from the trigger zone evoke reflex vasoconstriction involving the trigeminal structures, resulting in increased ischemia and pain.

3. Of particular interest are the numerous investigations dealing with the response to vitamin B_{12} in the treatment of nutritional anemias and neurologic disturbances. Alexander and Backlar[4] studied the cytochemical changes in the nucleic acids in nerve tissue in rats following parenteral administration of vitamin B_{12}. The results of their experiments indicate that animals receiving vitamin B_{12} have more pentose nucleic acid in such tissues as liver, spinal cord, and cervical sympathetic ganglia than the controls. While these investigators limited their experiments to animals, speculation regarding nutritional deficiency as an etiologic factor in tic douloureux is not without basis.

Clinical Manifestations

Severe paroxysms of pain, sudden in onset and affecting the maxillary and mandibular nerves on only one side of the face, are the outstanding symptoms. The ophthalmic branch of the trigeminal nerve is seldom affected.

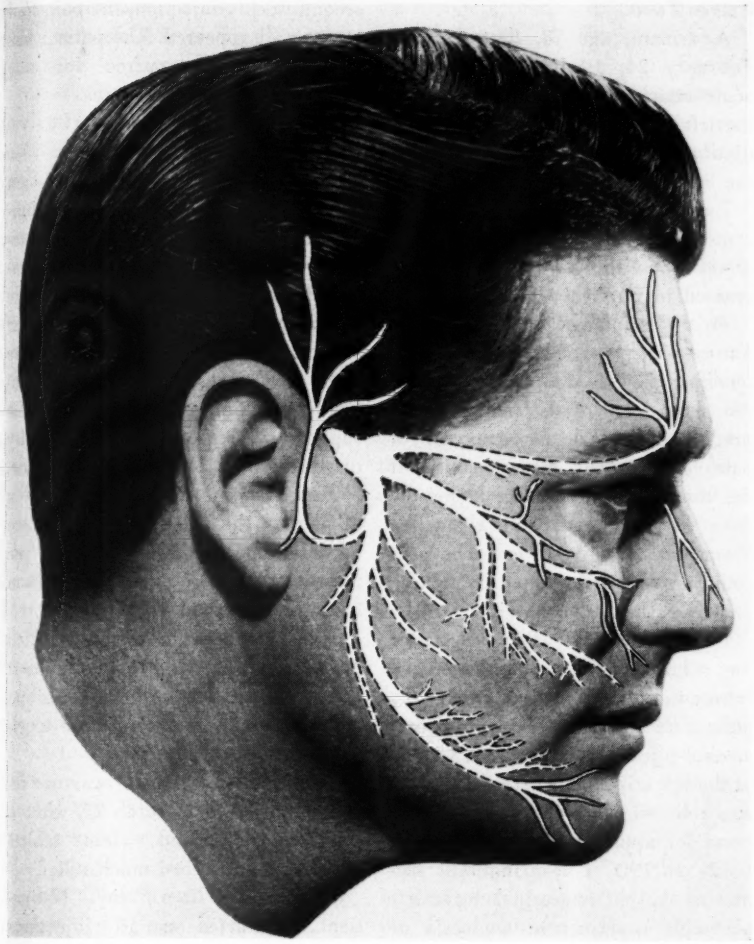
Length of Attack—A paroxysm may last from a few seconds to a few minutes and is often accompanied by twitching of the jaws, face, and eyelids. The skin over the affected area

[1]Stones, H. H.: Oral and Dental Diseases, Baltimore, The Williams and Wilkins Company, 1951.

[2]Grant, F. C.: Major Trigeminal Neuralgia, Amer. J. Surg. **27**:430 (Mar.) 1935.

[3]Karl, et al.: Mechanism of Pain in Trigeminal Neuralgia, Science **102**:12 (July) 1945.

[4]Alexander, W. F., and Backlar, B.: Nucleic Acid Changes in Rat Nerve Tissue after Parenteral Administration of Vitamin B_{12}, Proc. Soc. Exper. Biol. and Med. **78**:181 (Oct.) 1951.



1. ***Semilunar ganglion with three divisions of trigeminal nerve: ophthalmic, maxillary, and mandibular.***

turns red and the veins are distended. Stimulation of the secretory nerves may cause lachrymation, increased nasal secretion, and salivation.

Time Lapse Between Seizures—A considerable period of time may elapse before a second seizure is experienced, but this time interval is reduced as the attacks increase in severity. Fear of a paroxysm restricts the movement of the face and lips, resulting in a characteristic frozen facial expression.

Treatment

Various types of therapy have been attempted with varying degrees of success:

1. Some clinicians have advocated vitamin B_1, others nicotinic acid.

2. Short wave therapy and inhalation of trichlorethylene have proved beneficial in some cases.

3. Injection of alcohol (90 per cent) into the affected nerves at the site of their emergence from the cranial foramina has brought relief for periods up to eighteen months.

4. As a last resort, subtotal section of the sensory root of the trigeminal nerve has been performed in many cases. The incision is made between the semilunar ganglion and the pons, leaving the ophthalmic division intact.

Clinical Trial of Vitamin B_{12}—Because of the favorable results observed in the treatment of various neuropathies with intramuscular or subcutaneous injection of crystalline vitamin B_{12} (1000 micrograms per cubic centimeter), this agent was subjected to clinical trial in over 200 cases of tic douloureux. A summary of the results indicates that significant improvement was obtained in about 70 per cent of the patients treated, while 30 per cent showed only slight improvement or no benefit. Relief was prompt and complete in about 60 per cent of those responding to treatment. In the remainder continued treatment was necessary. Pain disappeared completely, however, or remained as a local tenderness without acute discomfort.

Patients Re-examined—Where vitamin B_{12} failed to provide satisfactory relief, the patients were re-examined. In a number of cases neuromas and dental cysts were found. After surgical removal of these lesions the patients no longer complained of the pre-existing pain. Thus the administration of vitamin B_{12} served as a therapeutic test.

Amount Administered—A course of treatment consisted of daily injections of 1000 micrograms of vitamin B_{12} for a period of ten to fourteen days. In about 40 per cent of patients responding to a course of treatment remission of pain persisted for periods of six months to over one year. In the remainder repeat courses, given at intervals of one to three months, produced satisfactory remission of symptoms. In a few cases weekly or biweekly injections were necessary to maintain relief from pain.

Results in Atypical Cases—These patients complained of facial pain but without trigger zones. The characteristic location and distribution of the pain were absent. The history revealed chronicity rather than periodic painful seizures. Results in atypical cases were uniformly unsatisfactory.

Case Reports

Of particular interest to dentists are the case reports of Fields and Hoff,[5] three of which are summarized here:

Case One—A woman, age 50, was admitted to the hospital September

23, 1950 because of severe paroxysmal pain in the right side of the face. This had been occurring intermittently for two years; the present attack was precipitated by yawning about six weeks previously.

Symptoms—The pain was sharp and lancinating, beginning near the angle of the mouth on the right side, radiating back to the angle of the jaw, and occasionally referring to the right side of the forehead. The outer margin of the lip near the right corner of the mouth acted as a trigger zone which, if touched, evoked a paroxysm of pain distributed as described. For several days prior to admission the patient had been inhaling trichlorethylene, which gave relief for a few hours.

Examination—The blood Kolmer-Wassermann was 3 plus; the patient stated that she had received a course of antisyphilitic therapy about three years previously. Examination of the spinal fluid revealed nothing abnormal.

Course of Treatment—(1) On October 2, 1950 the patient was given her first injection of 1000 micrograms of vitamin B_{12}. Eighteen hours later she could talk with greater ease, was able to eat her meals without pain, and could touch the right side of her mouth without eliciting a paroxysm.

(2) Two days later she received a second injection; improvement continued. The following day only an occasional vague burning sensation was present in the lower right half of the face.

(3) After a third injection on October 5, the patient remained asymptomatic until her discharge on October 13.

(4) She returned to the out-patient clinic on October 21 complaining of mild pain. An additional injection of 1000 micrograms was given. At last report, about six months after the institution of treatment, the patient was still asymptomatic.

[5]Fields, W. S., and Hoff, H. E.: Relief of Pain in Trigeminal Neuralgia by Crystalline Vitamin B_{12}, Neurology **2**:131 (Mar.-April) 1952.

Case Two

A woman, age 78, first seen on February 24, 1951, complained of acute attacks of paroxysmal pain in the left corner of the mouth and radiating along the lower jaw toward the left ear.

Increase in Frequence—The current attack had been present for four months and the paroxysms had increased in frequency and severity.

Pain Precipitated by Talking and Eating—The patient stated that touching the left side of her jaw below the corner of the mouth would precipitate a sudden paroxysm of pain beginning in the right side of the tongue and radiating along the floor of the mouth and along the lower jaw to the right ear. The pain could also be precipitated by talking and by eating.

Past History—(1) Two years after the original attack which occurred twenty-three years previously, the patient received the first of several alcohol injections in the third branch of the left trigeminal nerve. The pain was relieved on each of these occasions for approximately six months.

(2) In 1926 a postganglionic section of the left trigeminal nerve left her with a permanent analgesia of the left side of the face.

(3) About six months afterward, she began to have attacks of severe pain in the tongue, to the right of the apex. These attacks appeared every few months and paroxysms occurred about 10 or 12 times a day.

Effects of Vitamin B_{12} Therapy—One thousand micrograms of vitamin B_{12} were injected intramuscularly. After the third injection the shooting pain disappeared, leaving a burning pain restricted to an area 1 centimeter in diameter, to the right of the apex of the tongue. This did not restrict the patient's activity; she began to eat and gain weight, to talk and laugh freely, activities which hitherto had been impossible. Daily injections were continued for sixteen days. Thereafter they were given once a week although the burning sensation and attacks of circumscribed pain in the tip of the tongue still occurred. Three days after the second weekly injection, the pain and burning disappeared. The patient has now been symptom-free for two weeks.

Case Three

A woman, age 61, was first seen on March 27, 1951. Her chief complaint was of pain radiating posteriorly into the right cheek and occasionally upward into the right side of the forehead. There was a trigger zone in the nasolabial fold on the right side. Severe paroxysms of lancinating pain extending into the supraorbital region were occasionally directed posteriorly toward the ear.

Past History—(1) The first attack of pain in the right side of the face occurred in 1947. Since that time the patient had not obtained a remission lasting longer than a few days.

(2) The present seizure, which began about March 17, was the most severe. The patient was unable to eat and did not dare to wash or touch the right side of her face.

(3) Medical treatment was not received until about March 22, when a physician prescribed codeine tablets which did not afford much relief.

Vitamin B_{12} Gives Relief—The patient was started on daily injections of 1000 micrograms of vitamin B_{12} intramuscularly. By the third day she was completely relieved of the sharp paroxysmal pain, but the mild residual burning above the right eye persisted for about two days longer. Therapy was discontinued on the tenth day, and one month following discontinuance of treatment she reported that there had been no recurrence of pain.

Case Four

The three preceding cases were directed by physicians. Case Four was reported by a dentist[6]. The importance of vitamin B_{12} as a therapeutic agent is again emphasized.

Symptoms—A woman, age 48, complained of pain on the left side of the face, involving the neck, head, eye, gums in the lower jaw, and tongue. These symptoms had been present for four years. She had fre-

[6]Abramson, A. S.: Personal Communication (1952).

quent headaches, ptosis of the left eyelid and left side of the face, and diminution of tears.

Past Treatment—(1) Three years previously the patient was treated unsuccessfully with injections of alcohol into the mandibular foramen.

(2) One year later a neurosurgeon attempted avulsion posterior to the semilunar ganglion, performing the operation anterior to the ganglion. Immediately after the avulsion, the eye symptoms appeared, apparently the result of damage to the ophthalmic branch of the trigeminal nerve.

(3) One year afterward an anesthetist attempted injection of alcohol into the area of the semilunar ganglion, using an external approach through the cheek at different areas. The patient developed trismus and the paroxysms of pain became more severe and more frequent.

Psychiatrist Consulted—Unable to sleep on the left side and on the verge of nervous collapse, the patient consulted a psychiatrist who recommended that the dentist remove several lower teeth on the left side and inject alcohol into the mandibular foramen. This procedure gave relief for a period of only three days.

Vitamin B_{12} Relieves Pain—The dentist then administered daily intramuscular injections of vitamin B_{12} (1000 micrograms each) on ten successive days and discontinued all other therapy. Within four hours of the first injection the patient was relieved of pain. All symptoms disappeared after seven days of treatment, but daily injections were continued for twenty days. The patient is now performing housework and leading her normal life.

Discussion

New methods of treatment, particularly of tic douloureaux, should be approached with caution. From the results of treatment, however, in more than 200 cases with crystalline vitamin B_{12} (1000 micrograms per cubic centimeter) it is apparent that this mode of therapy offers considerable promise in the alleviation of a disease which has caused infinite concern to physicians and dentists.

Coincidence with Spontaneous Remission Believed Untenable—While long periods of remission are evident in untreated patients, it must be remembered that these obtain only after the first or second attack. In the cases reported here the patients had experienced many such episodes before treatment with vitamin B_{12}. Experience has shown that as the attacks become more severe they also become more frequent, with shorter periods of remission. Thus, to postulate that the treatment coincided with spontaneous remission is untenable.

Relief from Paroxysmal Pain Precedes Secondary Discomfort—Treatment with vitamin B_{12} discloses the interesting fact that relief from paroxysmal pain precedes relief from the secondary burning paresthesia.

Mechanism of Effect Studied—It is difficult to understand the mechanism involved in the disease process and the precise effect of vitamin B_{12}. Injection of this vitamin cannot be considered as replacement therapy since the dosage employed was far above minimum requirements. It is possible that the improvement observed after injection of massive doses of vitamin B_{12} is the manifestation of a pharmacologic effect of the agent rather than the result of satisfying a physiologic requirement. Undoubtedly further study will elucidate the role of vitamin B_{12} in the pathogenesis of tic douloureux and other neuropathies.

Vitamin B_{12} Preferred Agent—Because of the relief from facial pain obtained after injections of crystalline vitamin B_{12}, consideration should be given to initiating treatment with this agent in preference to alcohol injection or neurectomy. The latter methods should be employed only after it has been proved that vitamin B_{12} failed.

Important Adjunct in Treatment—Tic douloureux has long been a perplexing medico-dental problem. It is believed that with the advent of this mode of therapy an important tool has been added to the dentist's armamentarium.

Rahway, New Jersey.

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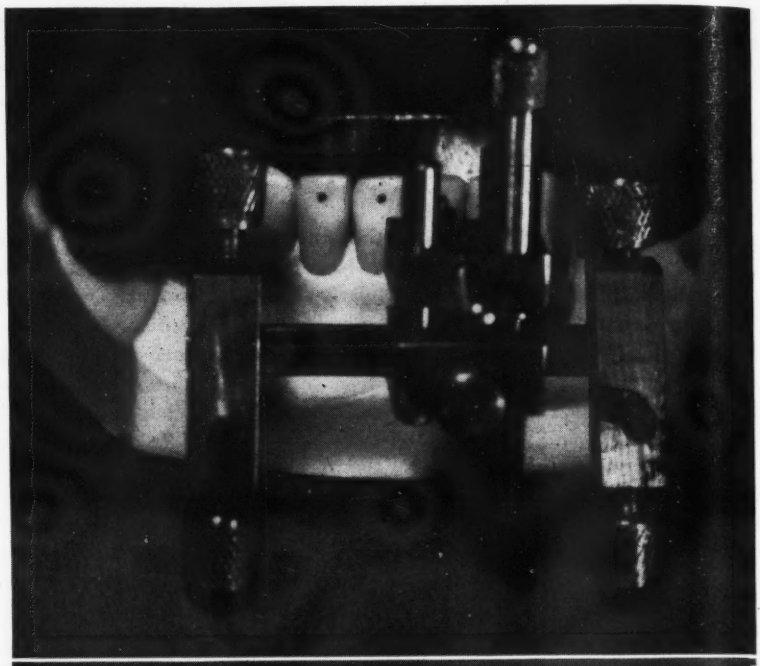
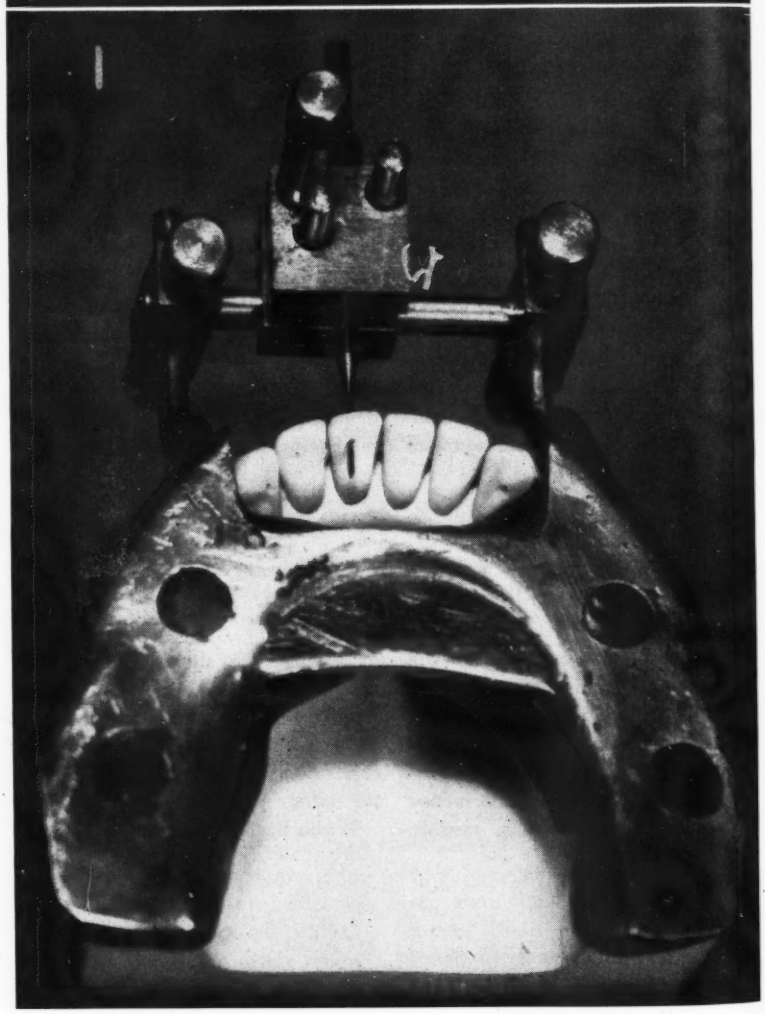




DIGEST

A survey of dental literature reveals that for years the problem of stabilizing loose teeth by union to stronger ones has been appreciated and a solution of the problem attempted. This article describes a technique for the retention of a cast splint to teeth periodontally involved by means of precision horizontal pins.

Advantages

In the use of precision horizontal pins for retention of a cast splint the following advantages are assured:

1. The teeth are stabilized
2. The splint is comfortable to wear
3. The splint is nonirritating to the gingival tissues
4. The casting fits perfectly to the teeth
5. There is no interference with the maintenance of oral hygiene
6. Esthetic appearance is provided
7. A minimum of tooth preparation is required
8. Construction is simple

---

1. *Paralleloguide.*

Technique

Preliminary Measure — 1. In all cases it is recommended that pathologic conditions be eliminated as much as possible before the construction of the splint.

2. A complete set of roentgenograms is taken; these are studied to determine the pulpal anatomy.

3. Study casts are used to observe the occlusion and to make a tentative plan of the splint. The teeth involved are checked for rotations, elongations, and axial malpositions; those labial or lingual to the arch are noted.

4. A typical splint involves the mandibular anterior teeth. Horizontal perforations are drilled through each tooth from the labial through the lingual. The perforations in the incisors are drilled parallel to each other.

Steps in Procedure—1. The labial enamel is entered by means of a half round bur on a straight handpiece. The continuation is effected by a square drill 0.7 millimeter in diameter. For this step, to ensure parallelism, the paralleloguide (Fig. 1) is utilized.

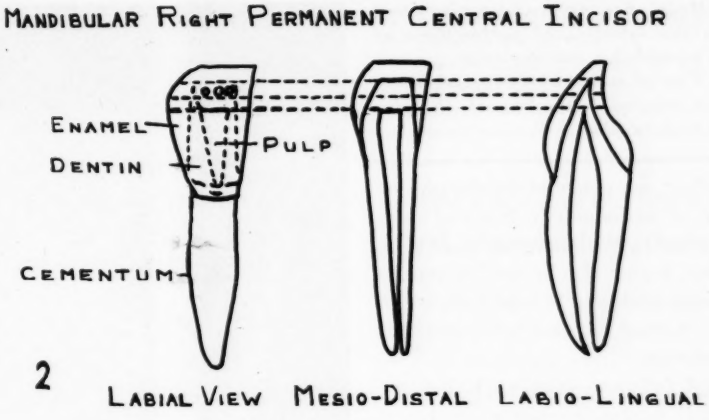
2. The perforations are placed in position within the dentin between the incisal surface and the pulp (Fig. 2).

3. The cuspid perforations are drilled non-parallel. These are made lateral to the median axis of the tooth to avoid exposure of the longer pulpal horns (Fig. 3). These perforations are enlarged to fit 0.8-millimeter pins.

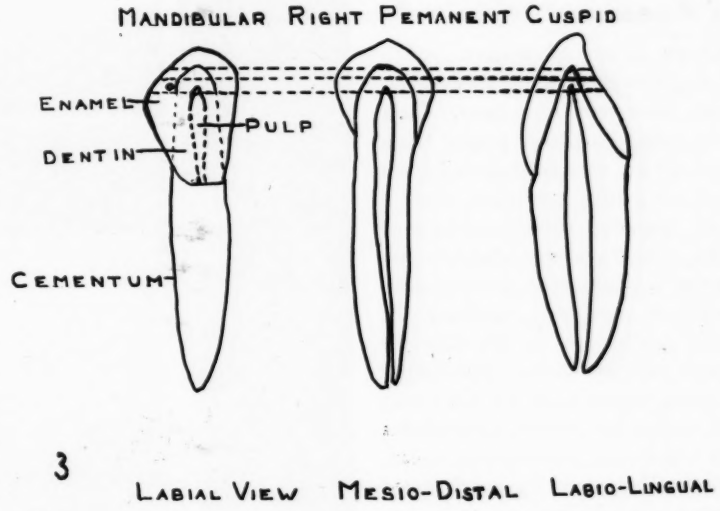
4. Precisely fitting pins of 85 per cent platinum and 15 per cent irridium are placed into the perforations (Fig. 4). Key forms are soldered to the lingual end of each pin to ensure retention and to establish a riveting effect in the casting.

5. The pins are recurved upon themselves and are inserted from the lingual of the four incisor teeth. Steel pins, 0.8 millimeter in size, are inserted into the cuspid teeth from the labial.

6. A small perforated tray which fits the lingual surfaces is filled with Dietrich elastic compound and adapted to the lingual surfaces of the mandibular teeth, care being taken to maintain the parallelism of the incisor pins. The steel pins are embedded in the impression material.



2. ***Mandibular right permanent central incisor.***



3. ***Mandibular right permanent cuspid.***

Pressure Maintained — Constant pressure is maintained until the compound is thoroughly chilled. The cuspid steel pins are removed; and the impression is removed from the lingual. The cuspid pins are now lubricated and replaced in the respective openings in the impression (Fig. 5). The cast is poured in a hard investment material.

Final Steps in Procedure—1. The design for the complete splint is waxed to the cast (Fig. 6).

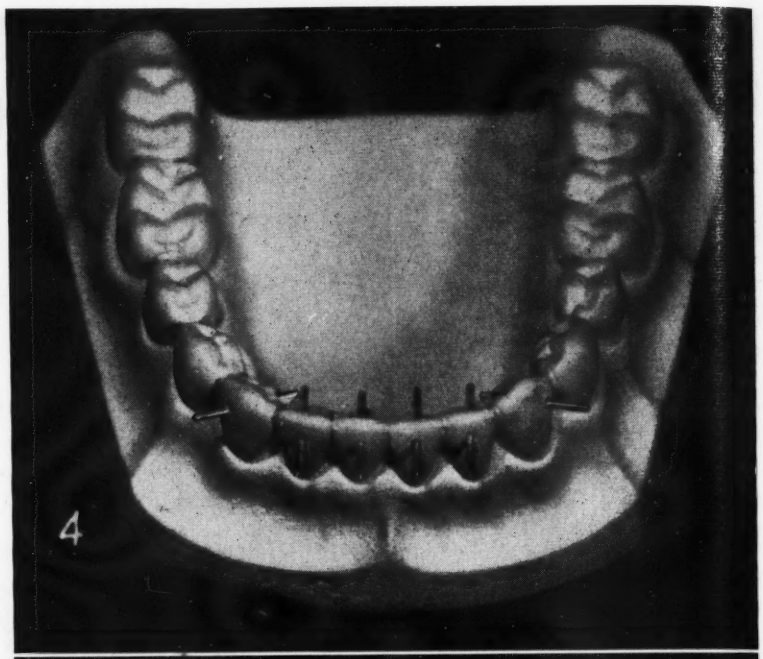
2. The cast, made in hard gold (Fig. 7), is trimmed, polished, and fitted in the mouth.

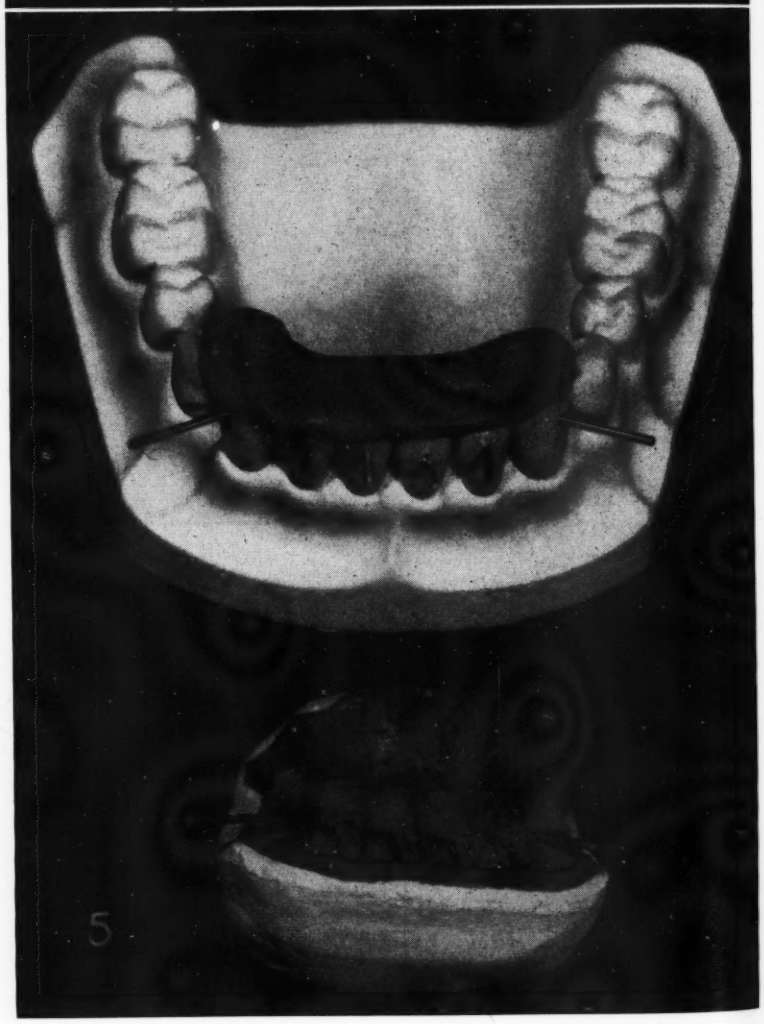
3. Cementation is completed in a dry field. A slow setting cement is placed within the splint and into the perforations. The splint is pressed into place and while the cement is setting, the cuspid pins are inserted from the lingual and held in place.

Conclusion

A procedure is described for completing an easily constructed, fixed appliance which is an aid in the maintenance of natural teeth. While the purpose of the appliance is primarily

4. ***Model showing precision pins fitted into the labiolingual perforations of the mandibular anterior teeth.***
5. ***View of model with impression material adapted to the lingual; the pins are seen in place.***





to effect the potentialities for the repair of periodontally involved teeth by adhering to all the established principles, it may also be used to replace missing teeth and to hold teeth which are shifting because of pathologic conditions.

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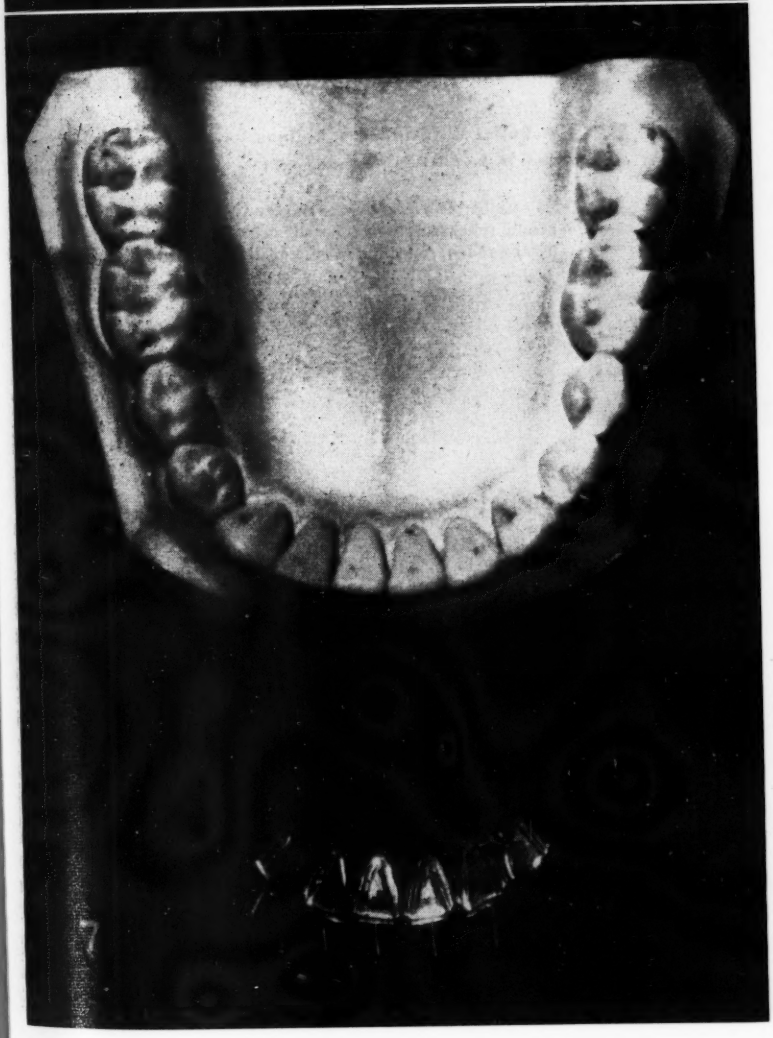
Prevention of Cancer

CERTAIN lesions of frequent occurrence are of great significance as possible precursors of cancer. Their early recognition and proper treatment are not only good medicine but good preventive medicine, since a small operation done in time may make a later radical operation unnecessary. Prominent among these conditions are those involving the buccal cavity, and in this field the dentist has the earliest opportunity in many instances to see the lesion and advise the patient. Leukoplakia is a well known precancerous lesion, and may be caused by poorly fitted dentures. Jagged teeth which lead to repeated lacerations and ulceration are a serious precancerous hazard, and their removal or correction may avoid the development of carcinoma later.

Other benign and inflammatory lesions have a recognized tendency to become malignant, and in undertaking their diagnosis and cure, the physician is practicing cancer prevention. These include plantar warts, skin keratoses, thyroid adenoma, fibroadenoma of the breast and chronic cervicitis. Physical examination aided by the Papanicolaou technique (cytological study of smears from hollow organs and body cavities) makes early detection possible.

From Advances in Preventive Medicine, *Lederle Bulletin* **18**:No. 1, 12 (Feb.) 1953.



6. ***Wax pattern for the splint carved and adapted to the cast.***
7. ***The cast splint ready to be cemented into position.***

Cleft Lip and Palate and Parental Age

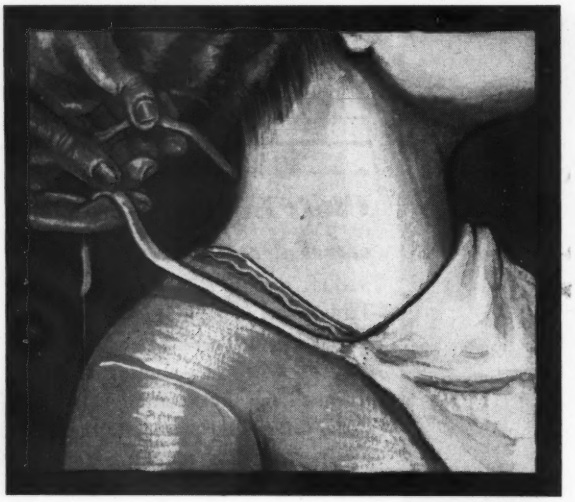
THE CAUSE of cleft lip and palate is still imperfectly understood. A century of study has eliminated superstitions and unwarranted assumptions, but a final answer to the problem is still being sought. Several observers, including the author of this report, were under the impression that the parents of children with cleft lip or palate were of greater than average age. To verify this, McEvitt[1] made an analysis of 282 chronologically consecutive and unselected cases of cleft lip and palate listed in the files of the Straith Clinic. As a control group the birth registrations of the Detroit Health Department were tabulated. The comparative analysis of these two groups revealed that parental age had *no bearing* on the incidence of cleft lip and palate.

Other Theories of Cause—The author briefly reviews other theories of the cause of cleft lip and palate, such as intrauterine trauma, dietary deficiencies of the mother, communicable disease, such as German measles, in the mother, but shows that none of these seem to have any bearing. The only causal factor for which there is evidence is heredity, but the incidence even among children of a deformed parent is not great, although it has been estimated at 20 times as common among the children of afflicted parents as in the general population.

Hereditary Influence—Any unborn child has about one chance in 750 of being born with a cleft lip or palate, but once the deformity appears the situation changes. In this case the gene is known to be present and the odds are possibly 50 to 1 that it will

(*Continued on page* 240)

[1]McEvitt, W. G.: Cleft Lip and Palate and Parental Age: Statistical Study of Etiology, Plas. & Reconstruct. Surg. **10**:67-148(Aug.) 1952.



1

Clinical and Laborator

A Dental Napkin

H. W. Everett, D.D.S., Emporia, Kansas

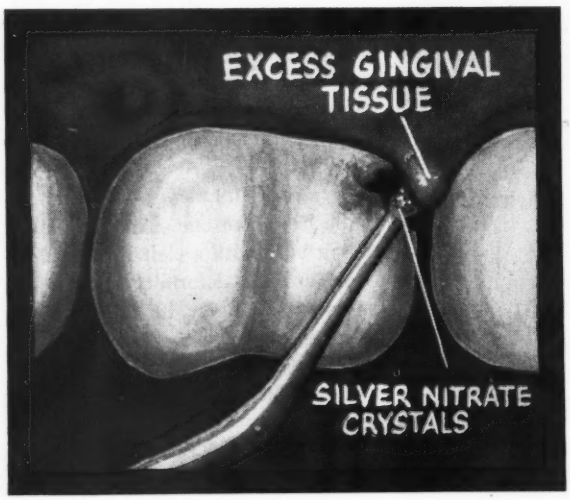
1. Sew pieces of twill tape to an ordinary dental napkin to make a combined napkin and neckpiece. This combination eliminates separate metal clip or holder.

2

A Relief for Autocure Relines

Jack M. Bart, D.D.S., Riverside, Calif.

2. Cut a piece of adhesive tape to the desired size and shape for palatal relief and attach it to the denture before placing the acrylic for the reline. After the acrylic has set the tape is easily removed.



3

Removing Excess Gingival Tissue from a Cavity

Captain Francis J. Samaha, USAF (DC), Bergstrom, Texas

3. Heat the end of a small burnisher and dip in silver nitrate crystals. When the silver nitrate is crystallized on the instrument, rub this lightly on the excess tissue until it is removed. With this method of tissue removal there is no hemorrhage.

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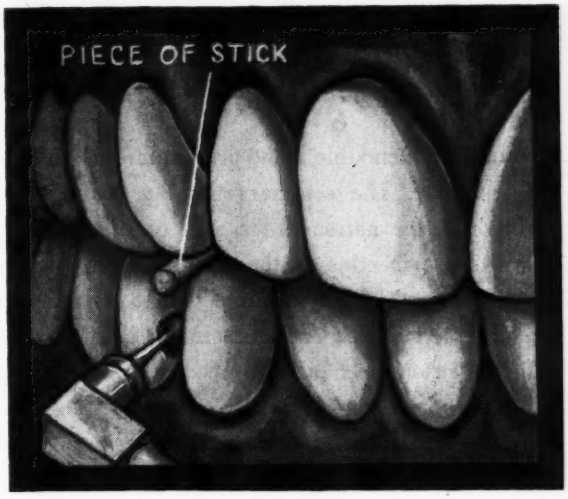
SUGGESTIONS . . .

Obtunding Without Anesthetics

Charles B. Branson, D.D.S., Lincoln, Neb.

4. When it is desired to prepare a gingival cavity without using anesthesia, place a stick on the tooth and have the patient exert *heavy biting pressure* while the drilling is done.



4

A Preservative for Models

Fabian T. Bofenkamp, D.D.S., Littleton, Colo.

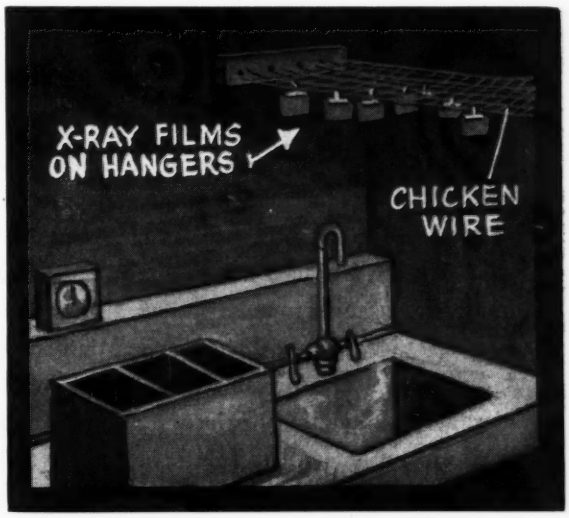
5. A mixture of chloroform and methyl methacrylate polymer to the consistency of castor oil makes a solution that gives a glazed finish to plaster or stone models and acts as a preservative.

5

Extra Hanging Space for X-ray Films

William J. Simpson, D.D.S., Niagara Falls, Ontario

6. Fasten chicken wire above the x-ray processing tanks in the darkroom. This arrangement provides adequate space for drying film.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 230 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S *Page*

HIGHLY commendable is the present interest in dental medicine. The seminars that are being held throughout the nation are a sign of this interest. Dentists are meeting at these seminars to discuss the fundamental biologic subjects that underlie all dental practice. The emphasis is on life processes rather than on mechanical procedures. Underlying *all* disease is a change in body chemistry. Susceptibility to caries and degenerative diseases of the oral supporting tissues are more than local events. Our point of view is shifting from the circumscribed local to the broad and systemic. We are beginning to see dental disease in the framework of the total patient.

The present seminars in dental medicine have, however, some serious weaknesses. They are not based on a general philosophy of disease; they are concerned with details and sophistry rather than with broad biology; they do not offer or even suggest an action pattern that will aid the dentist in clinical diagnosis and treatment. The subject presentations are often done with consummate lecturing and teaching skill but the end result has little practical meaning to the practicing dentist.

For example, the broad subject of biochemistry may be presented with long chains of equations and spectacular symbols on a blackboard. Enzymes and hormones may be named with amazing scholarship and often to the consternation of the dentists in the audience. This is interesting information but it is not valuable. It is strictly verbal and nonactive. The dentist who accumulates this information adds to his store of biologic awareness but he adds little or nothing to his action pattern in dental practice.

What should constitute a basic philosophy of disease? To develop such a philosophy one must rid himself of certain circumscriptions in his thinking. He must cast aside the dichotomies: Mind-body, local disease-systemic disease, organic-functional. He must accept the unitary principle that man is a total organism of interrelated parts, indivisible and whole, operating in an environmental field. He acts and reacts as a unit to other organisms and institutions in the environmental field and they in turn act on him.

If this unitary philosophy is accepted it means that dental medicine is not an isolated study but that it is a study of man in total structure and total function. To be sure, the emphasis in seminars on dental medicine should be on the oral manifestations of disease and the management of such disease processes by the dentist. The undertone of organismal unity, however, must be forever played in the background.

A philosophy without a method is a sterile intellectual exercise. Supposing the unitary principle is accepted, what then? It is without meaning unless we do something with it. An action pattern, a method of diagnosis and treatment, is the proper outgrowth of a seminar on dental medicine—or for that matter in any study in the field of medicine.

Where should we begin? It is absurd to consider the saliva without regard to the tissue from which it forms, blood. It is ludicrous to consider the mechanism of inflammation within the oral cavity unless we consider the results of such inflammation in other parts or the causes of this inflammation from systemic sources. It is a dangerous folly to think of fluoridation as a partial preventive of dental caries without considering what this trace chemical may do to other organs and systems.

There are available to the dental profession precise methods of biochemical measurement that give important clues to the functioning of the organism as a whole as well as to determine the status of dental immunity and susceptibility. Dental diseases are expressions of organismal imbalances; they are not mere local affairs. These biologic methods should be more fully discussed before dental medicine seminars and they should be more completely reported in the literature. This dental journal plans such presentations in the early future. The dental profession may be the leader in the entire field of preventive medicine if it sees and seizes these opportunities.

A new, practical procedure for *characterizing* dentures has become the biggest news in prosthesis since the advent of acrylic denture materials!

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MEDICINE and the Biologic Sciences

Heart Failure and Environmental Heat

In warm nontropical regions persons with congestive heart failure and the aged are particularly subject to heat stroke during sudden changes in weather and recurrent heat waves. Patients with congestive heart failure cannot tolerate excessively warm atmospheres.

When human beings are exposed to a hot, humid environment, elimination of body heat is impaired. Vasodilatation of the superficial vessels occurs with increased cardiac rate, faster circulation, and augmented cardiac output. In the presence of cardiac disease with diminished cardiac reserve, acute left ventricular failure may be precipitated.

Comparative tests have been carried out in controlled observation rooms. Patients were studied when the temperature and relative humidity were raised from 73 degrees Fahrenheit and 60 per cent respectively to 104 degrees Fahrenheit and 85 per cent respectively.

Under such environmental stress, healthy persons have an initial rise in skin temperature. This is followed shortly by more gradual rise of the rectal temperature. The following conditions usually ensue: (1) tachycardia, (2) increased respiratory activity, (3) tachypnea, (4) hyperventilation, (5) slight dyspnea, and (6) sometimes the hyperventilation syndrome. Extreme peripheral vasodilatation with considerable decrease in the diastolic blood pressure is noted.

As the exposure is continued, the subject becomes irritable, weak, faint, and complains of being extremely hot. Later, the central nervous system is affected, producing headache, visual disturbances, and restlessness as well as muscular tremors.

Patients with congestive heart failure react similarly but less predictably than control subjects. Extreme dyspnea, orthopnea, apprehension, and other indications of left-sided failure develop early in the cardiac patient. Acute cardiac asthma is usually precipitated and is manifested by rales, dyspnea, venous engorgement, and a gallop rhythm. A gallop rhythm is noted in 75 per cent of the subjects.

Premature beats, if already present, are decreased in frequency with the appearance of tachycardia. They recur when the rate falls during recovery from the heat. Hyperthermia occurs earlier and is more sustained in patients with heart failure. Cardiac patients lose more weight and the diastolic pressure declines less during exposure to the hot and humid atmosphere than do controls.

It is also noted that patients with chronic pulmonary disease are intolerant of a hot and humid atmosphere.

Berenson, G. S., and Burch, G. E.: Environmental Heat and Heart Failure, Am. J. M. Sc. **223**:45-53 (*January*) 1952.

Glaucoma

All patients over 40 who have eye symptoms should be carefully checked for the possibility of glaucoma. This is especially true when halos or a unilateral disturbance of vision is present. In 1951 glaucoma was responsible for 15 per cent of all cases of blindness in England.

The chief sign is raised intraocular pressure which may be secondary to a concomitant pathologic process. The cause of primary glaucoma is neither obvious nor well understood. Two main types exist in adults: (1) congestive, and (2) simple.

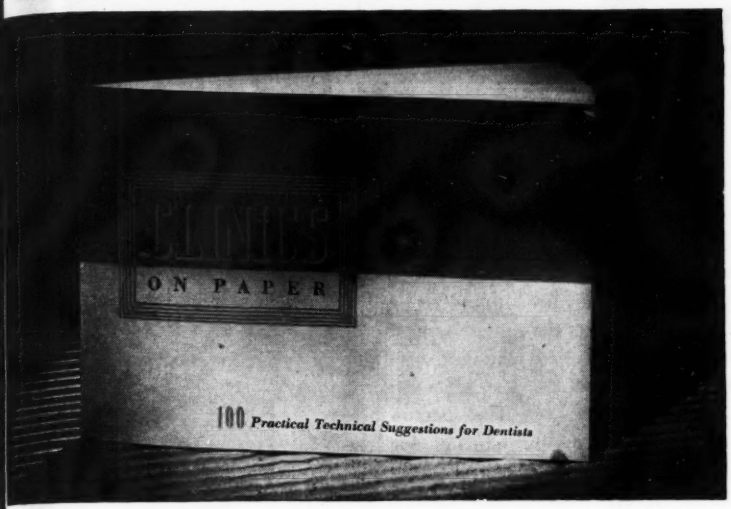
Congestive glaucoma is ordinarily accompanied by a shallow anterior chamber angle. This type of glaucoma is often acute in onset. The attack may strike a previously healthy eye without warning and usually at night. Severe pain in the eye radiates throughout the distribution of the trigeminal nerve. Lachrymation is profuse and the eyelid and conjuctiva are swollen. The eye is red, angry, and hard, with a dull, insensitive, edematous cornea and dilated pupil. Vision may be reduced to perception of light.

Recognition of warning symptoms is of importance in congestive glaucoma because an acute attack may be avoided. Halos or rainbows around lights, short episodes of pain in the eye and temporary blurring of vision are significant. A glaucomatous halo is best seen by looking at a point focus of bright light in a dark room. Two colored rings are usually seen, an inner blue-violet and an outer yellow-red.

Simple glaucoma, in contrast to congestive, is insidious. The presenting symptoms are not specific. Early indications are (1) a difficulty in close work often ascribed to a haze on the spectacle, (2) constant eyeache, (3) trouble in reading, (4) gap in the visual field, and (5) a permanent blur in one eye. Sometimes no symptoms are noticed until glaucoma is permanent.

Defects in the visual fields are a valuable adjunct in the diagnosis of early simple glaucoma. Such alterations rarely appear with congestive glaucoma. The threat to vision is greater in the simple group.

Primary glaucoma in general is seen in persons over 40. The conges-



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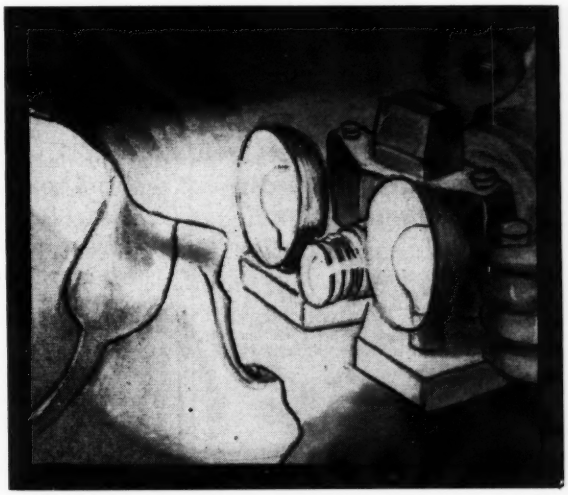

tive type is common in women and in nervous, tense persons. The importance of establishing an early diagnosis cannot be overlooked.

Miller, S. J. H.: Glaucoma: Congestive and Simple, British M. J. **4756**:456-461 (*February*) 1952.

Obesity

Obesity should be regarded (1) as a symptom, (2) as a problem, and (3) as a challenge. Certain conditions including the following, are usually associated with obesity: (1) increased incidence of diabetes, (2) hypertension, (3) atherosclerosis, (4) varicose veins, and (5) toxemia of pregnancy.

Obesity represents a disturbance in hemeostasis which is often initiated and maintained by psychologic factors. Food to the obese patient has an exaggerated importance beyond the caloric value. Only when caloric intake exceeds energy output is weight gained. Physiologic, cultural, social, and economic, as well as psychologic factors influence caloric intake.

Persons with endocrine disorders may have obesity as one of the symptoms. However, an extremely small number of overweight people have endocrine abnormality. Hormones influence the distribution of fat, but hormones have not been found to be the key factors in the regulation of caloric intake. Lack of exercise does not appear to be of great significance in producing obesity. The person whose hemeostatic mechanism for maintaining constant weight is intact reduces caloric intake when energy output is decreased.

The overweight child usually comes from a small family in which the mother is dominant and seemingly overaffectionate. The affection is expressed by overfeeding but is mixed with an underlying hostility which causes the mother to nag and criticize the child.

Food becomes a bribe to retain affection and dependency. The obese child grows up with a feeling of insecurity and helplessness, and food becomes the only known source of comfort and satisfaction.

Obese adults are often emotionally immature, passively dependent and helpless in meeting the exigencies of life. In the face of failure and frustrating experiences, comfort is sought in eating. To the obese patient, food represents love, security, and satisfaction and provides a means of relieving the ever-present tension.

Attempts to treat the obese patient merely by handing out a reducing diet even in conjunction with anorexigenic drugs, are generally futile. Successful therapy begins with a complete history of the person's early developments, relationship to parents and friends, sexual and social adjustment, reaction to stress situations, and other factors important in personality development.

Parson, William, and Crispell, K. R.: The Problem of Obesity, M. Clin. North America **36**:385-392 (*March*) 1952.

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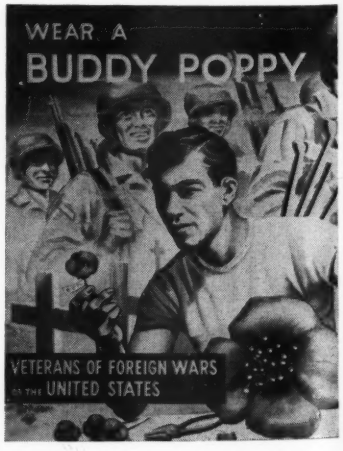

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(*See pages* 222 *and* 223)

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$10 will be paid on publication for each suggestion that is used.

Constipation

Three of the most important causes of constipation are (1) failure to eat enough roughage, (2) lack of sufficient amounts of fluids, and (3) improper eating habits. Atonicity or hypertonicity of the colon may be produced by psychogenic and neurogenic disorders and similar conditions associated with functional disturbances of the nervous system. Both atonicity and hypertonicity interfere with normal bowel movements.

The voluntary neglect of immediate response to the urge to defecate and the failure to take sufficient time to do so may cause constipation. Habitual failure to answer the normal urge eventually dulls the mechanism by which evacuation takes place. This leads to a need for regular use of cathartics and eventually to the establishment of habitual constipation.

A certain amount of exercise is necessary to maintain tonus of intestinal muscles. Fatigue or lack of exercise may be responsible for constipation.

Regularity of bowel movement may be disturbed by endocrine upsets. The relationship between endocrine glands and the autonomic nervous system, upon which tonus of the gastrointestinal tract depends, is well known. In many instances thyroid deficiency leads to insufficient bowel stimulation with a resultant constipation.

Constipation associated with infectious diseases, chronic debilitating disorders, chonic diseases, and malnutrition may be explained on the basis of either toxemia or loss of muscle tonus, or both.

Frequently gastric ulcer and cancer are accompanied by constipation. Gall bladder disease, with or without gallstones, has constipation as a presenting symptom. The constipation is explained by reflex action and colon spasticity.

Constipation is produced by interference with expulsion of the feces in anorectal diseases such as (1) fissures, (2) hemorrhoids, and (3) spastic disturbances of the rectal

sphincter. Local surgery yields excellent results in these cases.

Mechanical constipation results from the following conditions: (1) malignant and benign strictures, (2) strangulated hernia, (3) volvulus, (4) intussusception, (5) tension, (6) foreign bodies, (7) organic diseases of the colon, and (8) external pressure as from malposition of the uterus.

Too frequent use of cathartics lead to constipation. Most cathartics eventually lose their effectiveness when habitually taken. Patients therefore find it necessary to use the drugs more frequently and in larger doses. Or they may seek stronger cathartics or change repeatedy from one cathartic to another. Finally, artificial means such as suppositories, exercises, high colonic irrigations and other devices are used.

There is no difficulty in establishing a diagnosis of constipation. Still a thorough and careful physical examination should be made to exclude an organic cause.

Treatment of constipation may not prove simple. Psychotherapy is important. Exercise and avoidance of a sedentary life must be given consideration. A proper diet and adequate amounts of fluids are of value. Many artificial bulk-producing products are on the market today but foods of natural bulk are preferred. With many artificial bulk products, adequate amounts of fluids must be consumed.

Katz, Elihu: Constipation, Mod. Med. **20**:170-172 (*May* 15) 1952.

Chronic Edema of the Lower Limbs

Chronic edema of the lower limbs results from the prolonged accumulation of interstitial plasma in the tissues. There are two fundamental causes: (1) disturbance of the venous circulation or venous edema (phlebedema), and (2) disturbance of the lymphatic circulation (lymphedema).

Venous edema is distal, depressible, and easily reductible by recumbency. It often causes dermatitis, pigmentation and ulcers and occurs as a re-

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Here are answers to some of the 999,999 questions about P. F. Amco's new filling material that adheres to tooth structure without undercuts.

Does a deep cavity require cement before filling with P. F.?

We feel that any deep cavity requires a softer mass between the pulpal wall and the hard P. F. filling. That is why nature placed soft dentine under hard enamel. Build up the lost dentine with dentine-like AMCO CEMENT, then re-enamel the tooth with hard enamel like P.F.

How do you fill a tooth with P. F. when it has a near exposure?

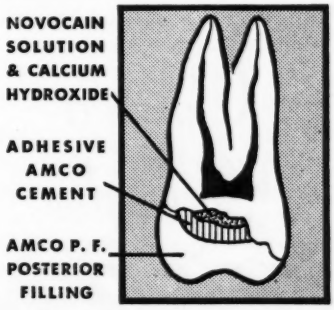
A near exposure requires treatment. Sterilize with phenol. Neutralize with alcohol, alevol, or just plain water. Cover the area involved with a mix of calcium hydroxide and solution of your local anesthetic. After the mix has set a little, seal it with AMCO CEMENT, using the brush technic. Immediately complete the filling with P. F.

Should the last bit of decay be removed if an exposure would result?

No. Treat the tooth as above. We do not pose as an authority on operative, but the answers were gleaned from reliable sources.

What is meant by "no undercuts are necessary"?

Both AMCO CEMENT and P. F. are so adhesive that they require no undercuts in tooth structure, conventional preparation definitely, but no painful, tooth destroying undercuts. There is more strength left in the tooth, and P. F. restores the original strength.



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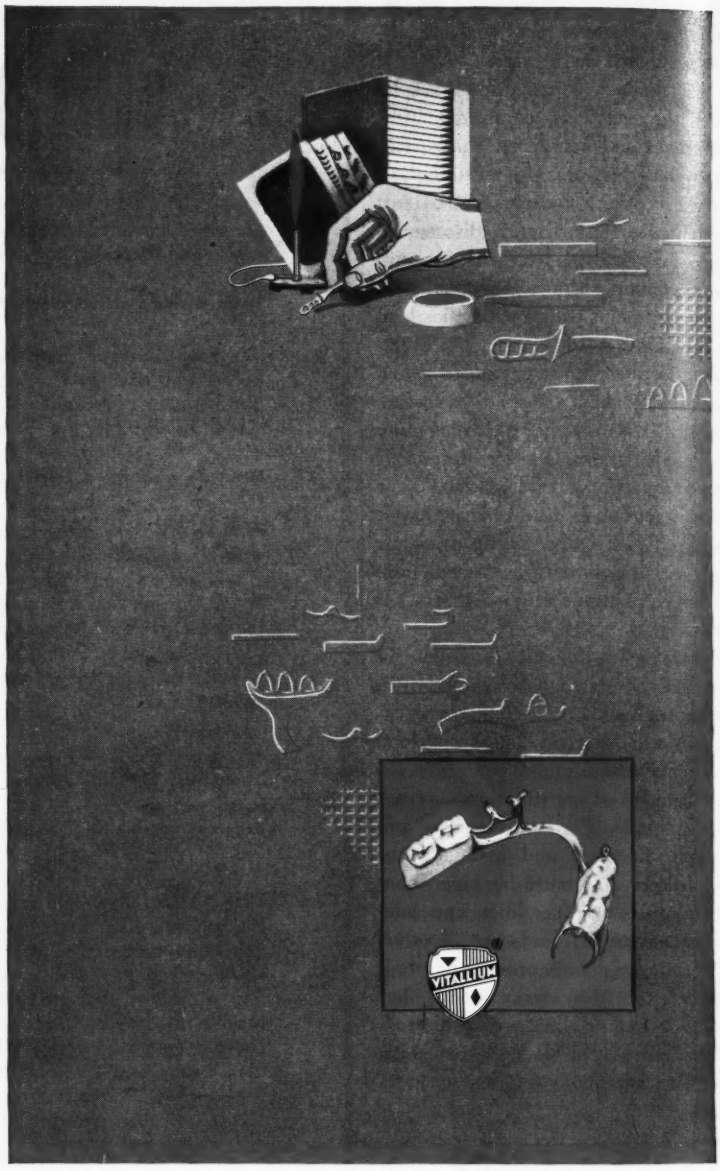
sult of deep valvular insufficiency, essential or postphlebetic, or as a result of venous obliteration. It rarely occurs from the presence of a congenital or acquired arterio-venous fistula. Usually the treatment of valvular insufficiency by deep ligation increases the edema.

Lymphedema differs from venous edema by being less common, harder, scarcely depressible, less reducible by recumbency, and total or rhizomelic in localization. It may be classified as: (1) congenital, (2) essential, and (3) secondary. The treatments indicated in essential lymphedema are lymphangio-plastic surgery and cutaneous plastic surgery.

Venous edema and lymphedema favor streptococcic infections. These provoke fibrous hyperplasia of the skin, the subcutaneous cellular tissue, and aponeurosis. The edema finally becomes irreversible and totally irreducible by recumbency.

Martorelli, F.: Chronic Edema of Lower Limbs, Angiology **2**:461-476 (*December*) 1951.



Contra-Angles

Five Things that Physicians Shouldn't do to Dentists

In that sparkling and forthright style that we have learned to expect from *Medical Economics* a dentist, Lewis J. Bell, tells physicians how they may avoid trouble with dentists.

Doctor Bell makes these suggestions:

"1. *Avoid making broad statements that may be misinterpreted by patients.* Often, for instance, a patient who is also receiving dental treatment may ask for your opinion on some feature of it. That's perfectly all right. But sometimes he puts his questions so disarmingly, and you answer so casually, that he sees implications in your reply that aren't really there.

"I doubt that any responsible physician would deliberately tell a patient to ignore his dentist's advice. Even if the M.D. had good reasons for believing the advice questionable, he'd generally be discreet enough to compare notes first with the dentist.

"But many misunderstandings are generated, I suspect, by the patient. Suppose a person is unhappy about a dentist's diet prescription. Suppose the patient one day asks the physician, 'Doctor, is there any good reason why I should stuff myself with green vegetables, which I detest?' Then suppose the physician casually replies that *he* wouldn't say so—that, as a matter of fact, he doesn't like vegetables himself.

"The effect is translated thus in the dentist's office: 'My doctor doesn't think I should follow the diet you gave me!' And the physician will probably never know that he helped create a minor crisis in dentist-patient relations.

"Where did the physician stumble? If he'd given the question an instant's thought, my guess is that he'd have wanted to know what brought it up. Having found out, I'm

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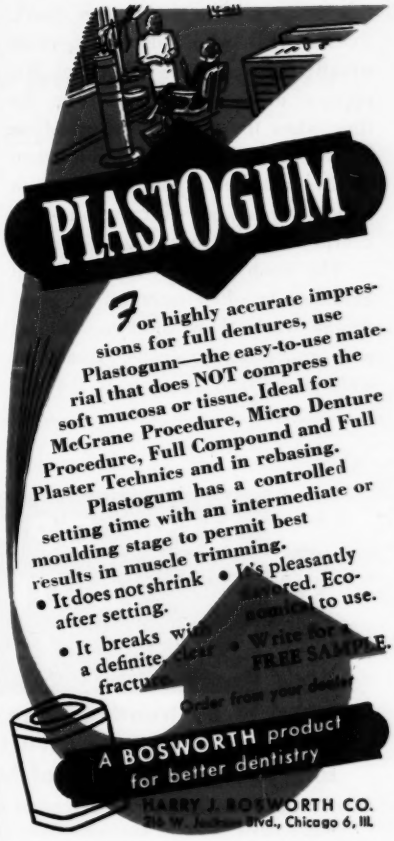
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sure he'd have worded his answer more diplomatically.

"2. *At least give careful consideration to the dentist's tentative diagnosis when he refers a patient back to you for further medical examination.* Does that sound obvious? That's what *I'd* have said—before some events like the following became known to me:

"A dentist, interviewing a new patient about his general physical condition, found reason to suspect a heart ailment. He telephoned the man's physician, who was unimpressed—since he'd examined the patient a few months earlier and found nothing wrong. But he promised to look into the matter.

"The physician apparently did make some sort of examination. At the end, he assured the patient that he was as sound as any man of his age could expect to be. And he added a few words to the effect that any dentist who ventures beyond the oral cavity is automatically suspect.

"The immediate result was rough on the dentist. Though he didn't lose his patient, he had lost a good share of the man's respect and confidence.

"But what happened next was even rougher on the patient: He suffered a heart attack.

"An extreme example? Perhaps—but not so far-fetched as you might think.

"Sometimes a physician rejects a dentist's diagnosis merely through personal pride; he believes *he'd* have been the first to spot a patient's disorder, if any existed. He may rely on the findings of an examination made many months before. Or he may simply feel that opinions not originating with other physicians aren't worth considering.

"The men who have these attitudes usually aren't aware of them or of the harm they can do. Such men know, of course, that today's dentist has had enough medical training to make good use of the diagnostic tools in his possession. And these physicians know—or should know—that the reputable dentist doesn't practice beyond his specialty.

"3. *Be willing to share your case history with the dentist and to consult with him when he requests it.* Presumably, like most physicians, you make a point of cooperating in

this respect. But some men don't.

"The M.D. who fails to cooperate usually belongs to the old school. His opinion of dentistry dates from the time when the tooth-puller relied on brawn rather than brain. But when finally prevailed upon to discuss a patient's treatment with an up-to-date dentist, he's apt to change his mind.

"He soon admits that medical guidance is often essential to good dental work. Few modern dentists will undertake extensive treatment without medical opinion if the patient has major systemic ailments.

"A physician's advice may be needed when questions about anesthesia or sedation arise. When soft foods prescribed for ulcer patients interfere with the control of oral disease, dentist and physician may have to work out a compromise diet. Certain medications damage diseased teeth and gums, and the dentist needs the physician's help to offset their bad effects.

"4. *Beware of specifying dental procedures that the dentist may find inadvisable.* This is another stumbling block that trips the old-school medical man more often than his younger colleague. What happens is something like this:

"The physician, tracking down the source of a low-grade infection, suspects a tooth that obviously has seen better days. So he sends the patient to the dentist with instructions to have the tooth pulled.

"The dentist may concur in the M.D.'s opinion, of course. On the other hand, he may find the tooth innocent of mischief. So *he* recommends leaving it alone.

"At this point, practically anything can happen. Patient and physician may gladly accept the dentist's opinion. Or the patient, having more confidence in the physician's verdict, may think less of the dentist for disputing it. Or—and this is the great danger—the physician may insist on standing by his diagnosis.

"I've heard of M.D.'s who have said to dentists in such situations: 'If *you* won't extract the tooth, I'll send my patient to a dentist who will.' Every so often, that's exactly what happens—with nobody better off in the long run.

"It's the dentist's business to know his specialty better than anyone else. If the physician doesn't feel this is true of a particular dentist, let him choose another in whom he has more confidence—and then make his referral with no strings attached.

"5. *Don't advise patients to postpone needed dental care because of the possible financial burden.* Some M.D.'s have done this when patients of modest means already face large medical bills. The excuse is that not many dental disorders (apart from a raging toothache) are considered real emergencies.

"Yet the patient may be ill advised without a word from the dentist. While the cost of certain procedures often poses a problem, solutions have been worked out by dentists in a wide variety of cases.

"It's true that some people can't afford all the services they should have at one time, even with dental budget plans. But there's another

By treating more children you realize income from a vast new market and you perform a vital health service.

It has been estimated that 244,000,000 fillings are required to restore mouth health to American children of 6 to 18...and that 33,000,000 fillings are needed each year to fill new cavities. And America's increasing birth rate will continue to increase! Caring for children is a super-human task for 80,000 dentists who serve millions of adults.

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alternative that shouldn't be overlooked—namely low-cost preventive care, which can make the waiting period safer.

"Physician and patient may both be agreeably surprised at what can be accomplished without an extravagant outlay. The M.D. who's aware of this fact and advises accordingly will not merely help his patient; he'll help improve physician-dentist relations, too."

Doctor Bell has presented the dentist's point of view effectively. Some of us may, naturally, disagree in minor details. I, for one, do not believe that dentists should prescribe diets for patients. I believe that we should suggest the principles of good nutrition that all people should follow to assure optimum health. We are within our bounds to mention the dangers of the denatured and denuded foods: white flour, refined sugar, acid content soft drinks. To put a specific patient on a definite diet is a responsibility of the physician. For my part, I do not wish to prescribe diets for the diabetic, the hypertensive, for the patient with ulcerative colitis. Many people with these conditions are ambulatory and are our *dental* patients. The diabetic patient frequently has severe caries and soft tissue inflammation. The hypertensive occasionally has pulpitis due to his elevated blood pressure. The person with ulcerative colitis often has a vitamin deficiency and a concomittant gingivitis. When I suspect any of these conditions I prefer to refer the patient for medical evaluation. I do not suggest specific treatment.

In this entire subject of patient management ordinary courtesy and good manners is the touchstone. Both the physician and the dentist has his ego— often, unhappily, expanded to large proportions. The patient as a human being is likewise possessed of his id, his ego, and his superego. No one wants these delicate psychic possessions trampled on or sullied.

"Nobody's tellin' me nothin'" is the mark of an ignorant man. But the same inflexibility, the same I'm-right-you're-wrong attitude in subtle and suave undertones prevails in many interpersonal relations. The dentist resents the patient who makes his own diagnosis and outlines his own treatment. We could all poison the patient who tells us "I would like you to clean my teeth today." That's an order and we resent it. Most of us are perverse enough when we receive such an order that we immediately do something else for the patient, almost anything else, than "clean" his teeth.

The physician does not want the dentist telling him how to treat a patient. The dentist who says to the patient "You better go to your physician and have a shot of penicillin" is as big a boor and ignoramus as the physician who tells the patient, "Better see your dentist and have an inlay put in that cavity." What leads to trouble in these two situations is the specifio nature of the advice given. No physician and no dentist is going to resent the suggestion to a patient, "Better see your physician (or dentist)." Period. Or one may add, if he wishes to toss in a little high-sounding learning, "Your phy-

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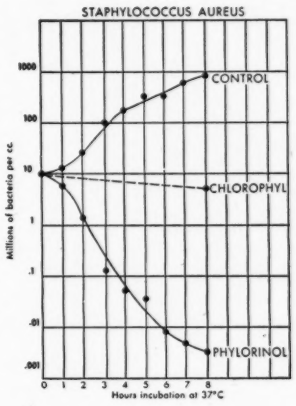

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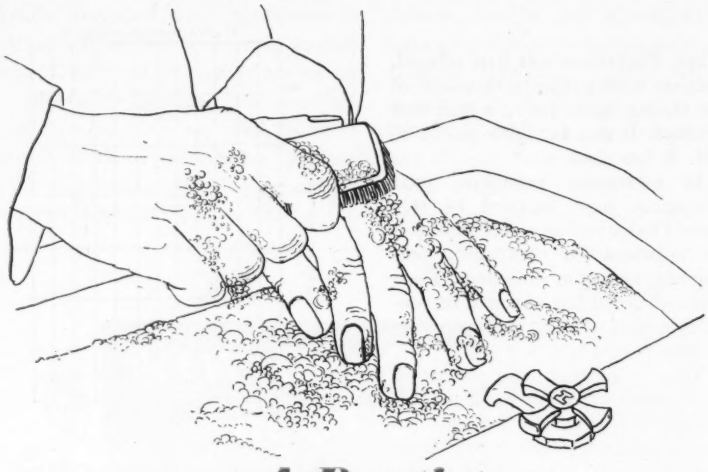

A Dentist Looks at His Dentists

Are you guilty of careless practices that annoy your colleagues as well as your patients? Before you answer an unqualified "No," read the article, "A Dentist Looks at His Dentists." The author (who must remain anonymous under the circumstances) relates his experiences in undergoing dental treatment at the hands of his friends.

★ ★ ★

How long has it been since you've looked with a critical eye at your office and the building in which it's located? William Eli Kohn, an architect, looks at dental offices in general and gives many suggestions for improving their appearance. He says, "For a profession which is restricted in its advertising, it is extremely important that the office or building possess positive characteristics which reflect the dignity of the profession." His is the award-winning article for May.

★ ★ ★

"To Stay Out of Tax Trouble, Keep Records," advises Harold J. Ashe. He suggests that the dentist save all receipts to be used as proof of deductions shown on the income tax return. Care and foresight can prevent many errors and penalties.

★ ★ ★

"Would You Be Happy Away from Dentistry?" Many a dentist has talked about "getting out of this ulcer-producing profession"—yet would find himself discontented in any other field. Dentistry yields rewards not found in many vocations: the pleasure of relieving suffering and pain, the advantage of independence, and the satisfaction of creating some degree of beauty.

★ ★ ★

If someone asked you, "Doctor, what is your mood today?" you would probably have difficulty in answering accurately. You have become so used to suiting your words and attitude to the needs of your various patients that you are like the actor playing a variety of roles. As Doctor Leo B. Dillon says in his article, "When We Talk With Patients":

"The dentist's skill includes not just his professional skill but also his ability to inspire confidence, soothe jagged nerves, allay all fears, and imply a personal interest in the patient's welfare."

★ ★ ★

Do you find yourself staying away from dental meetings, avoiding organizations of all sorts, and being too busy to take part in civic affairs? If so, take warning. Some authorities regard the habitual failure to participate in group efforts as a rather reliable symptom of mental regression. The article, "Non-Affiliationosis" explains why.

sician may wish to give you an injection of penicillin (or aureomycin, or terramycin, or ACTH, or cortisone)." But be sure that you are making yourself starkly clear that you are not suggesting *which* drug the physician should use.

I receive a good many patients that are referred to me by physicians and I have my share of physicians as dental patients. There is nothing unusual in this. Most dentists have the same experience. I can say, however, that my experiences seem to be somewhat more pleasant than many that I hear recounted by my dental colleagues. I am glad to accept *referred* patients, but not ones who come with an order or with a prescription for a specific procedure. Dentists are not nurses or pharmacists who receive orders and prescriptions from physicians. Dentists are on equal status in the eyes of the law with physicians inasmuch as they both have the responsibility for making diagnosis and treating people. A dental license does not permit a dentist to treat a person for tuberculosis or a brain tumor nor does the medical license signify that a physician is capable of making dentures.

Actually there is no hard and fast, iron-bound limitation on the legal extent of dental treatment. If, in the treatment of diseases of the teeth and tissues of the mouth, the dentist believes that good treatment requires a prescription for drugs, an injection of a drug, the administration of anesthesia, a blood or urine analysis, there is nothing in the legal field to prevent him carrying out these procedures. There is something, however, beyond legality and that is morality. A dentist has no moral right to prescribe, to inject, to anesthetize, unless he has the training and the skill to do so. Human beings should not be subject to the indignities of the ignorant dentist.

—E.J.R.

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